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DOMESTIC BIRDS
ROBINSON

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HOUDAN CHICKS WITH BARRED PLYMOUTH ROCK MOTHER

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OUR DOMESTIC BIRDS

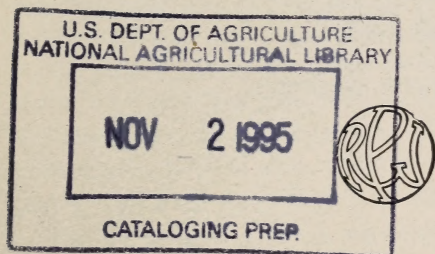
A POPULAR PRIMER OF AVICULTURE

BY

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Author of "First Lessons in Poultry Keeping," "Principles and Practice of Poultry Culture," and many books on special poultry subjects.



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PREFACE

"Our Domestic Birds" is a book for children too young to read books written for adults, and for older people too busy to read more technical works for the information of general interest which they contain. Its purpose is to teach the things that everyone ought to know about domestic birds. It is a book about these birds and their relations to man, rather than of instruction in practical aviculture, going into details of care and management only to show the first steps in the care and management of poultry, pigeons, and cage birds, and to give intelligent ideas of large-scale production.

The earlier in life such information as is contained in this book is acquired, the more surely will the person possessing it distinguish between the important and the trivial, the true and the false, the useful and the useless, in what is heard or read about a subject upon which far too much misinformation is circulated. It is a matter of common observation among those who give instruction in aviculture that those who learn the rudiments of the subject in childhood escape most of the mistakes of people who, without previous knowledge of such matters, take up some branch of this subject later in life.

The book was written especially for children who have reached an age when, if they are interested in poultry or pigeons, they will want to own some. Usually this is from the tenth to the twelfth year. At this age children begin to ask for feathered pets and to inquire about their care and management. The usefulness of the book, however, is not limited to children who can read it for themselves. Parents of children who cannot read will find that acquaintance with its contents will enable them to answer the questions little children ask about domestic birds, and to start a child in poultry or pigeon keeping before it can read at all—if that seems desirable. To people not conversant with such matters the idea of children of

such tender years having chickens or pigeons of their own may seem absurd. Yet it is a fact that for at least a century, and undoubtedly from very remote times, many children have been started with poultry at six or seven years of age, and some as early as four or five, because of their fondness for domestic animals, and because their parents thought it better to give them birds of their own, upon which they would fix their affections, than to be constantly annoyed by their persistent efforts to make pets of more troublesome or more dangerous creatures.

Children of such a disposition will as a rule take some responsibility for the care of poultry at an early age. Wherever circumstances permit, it will be found that to give such a child a few chickens is to provide it with an interest and an occupation which will help it to employ its time satisfactorily and to keep out of mischief. With a little oversight by an older person a child of six or seven can care for a small flock of fowls; and if it is properly aided and encouraged its interest in poultry will grow and expand.

As a rule, children who have a normal sense of responsibility are faithful in attention to living creatures in their charge, and also careful to follow instructions in caring for them. The age of carelessness in these things comes with the passing of childhood, and especially with entrance into the social life of youth. At that period most young people feel that the care of poultry interferes too much with other occupations and recreations, and discontinue it until settled in homes of their own. What a boy or girl may accomplish with domestic birds before reaching the transition stage depends upon the opportunities at home, and the use made of them and of available instruction in schools and in books. Suitable schools are accessible in comparatively few instances, but serviceable books are abundant. To follow this, the author's "First Lessons in Poultry Keeping" is recommended as a technical book which children in grammar-school grades can understand and apply.

JOHN H. ROBINSON

READING, MASSACHUSETTS

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OUR DOMESTIC BIRDS

CHAPTER I

BIRDS AND THEIR RELATIONS TO MAN

Definition of a bird. A bird is a feathered animal. The covering of feathers is the only character common to all birds and not possessed by any other creature. The other characters—the bill, the wings, egg-laying, etc.—by which we usually distinguish birds from animals of other kinds are not exclusive bird characters. Turtles have beaks, and there is one species of mammal (the ornithorhynchus) which has a bill like that of a duck. Many insects and one species of mammal (the bat) fly. Insects, fishes, and reptiles lay eggs, and there are several rare species of mammals that lay eggs and incubate them. On the other hand, some birds are deficient in one or more of the typical bird characters. The ostrich cannot fly. The penguin can neither fly nor run, and cannot even walk well. The cuckoo lays its eggs in the nests of other birds, leaving to them the hatching and rearing of its young. These exceptional cases are very interesting because they show that animals now quite different in structure and habits had a common origin, but in no case is there such a combination of characters that any doubt arises whether the creature is a bird or a mammal. The characters which typically belong to birds attain their highest development in them, and in most cases this is due to peculiar adaptabilities of the feathers.

The Anglo-Saxons' name for a bird was *fugol* (the flying animal). The young feathered creature they called *bridd* (the

thing brooded). This name was also sometimes given to young mammals, but it applied especially to the young of feathered creatures which were more dependent upon the parent for warmth than others. Our English words "fowl" and "bird" come from these Anglo-Saxon terms. At first "fowl" was applied to large birds and "bird" to small ones, but gradually the use of the name "fowl" was limited to the common domestic fowl, and "bird" became the generic name for all feathered creatures.

Place of birds in the animal kingdom. Zoölogists rank mammals higher than birds because man is a mammal and his general superiority to other creatures determines the rank of the class to which he belongs. Yet, while placing birds below mammals in a simple classification of animals, naturalists point out that birds are the most distinct class in the animal kingdom. If we compare birds and the lower mammals, and compare the relations of each class to man, we see at once that nothing else could take the place of birds either in nature or in civilization. Among birds are found the highest developments of animal locomotion and of the natural voice, capacity for language far beyond that of other creatures (except man), and family and community relations resembling those of the human race. Hitherto in the history of the world mammals have been more useful to man than birds, but birds have given him some of his best ideas, and with the advance of civilization the lower mammals become less necessary and birds more necessary to him.

Flight of birds. It has been said that "on the earth and on the sea man has attained to powers of locomotion with which, in strength, endurance, and velocity, no animal movement can compare. But the air is an element on which he cannot travel, an ocean which he cannot navigate. The birds of heaven are still his envy, and on the paths they tread he cannot follow."

Since that was written practical flying machines have been invented, but in these, as in boats and ships, man has merely

devised a machine which under his control can do laboriously and at great risk what the bird does naturally and easily. To birds man is indebted for his first lessons in navigating the water as well as for his ideas about airships.

Voices of birds. With few exceptions the different kinds of animals have natural languages through which individuals of the same species can to some extent hold communication with each other, and which are partly intelligible to other creatures. In all mammals except man, and in most birds, the range of expression is very limited and the sound of the voice is disagreeable; but a great many species of birds have very pleasing notes, many have very beautiful natural songs, and some readily learn the songs of other species. Man learned melody from the song birds. There are also many species of birds that can imitate a great variety of sounds, and even learn to speak words and short sentences. Birds that learn to talk often show intelligence in their use of words. This is the more remarkable because the intelligence of birds is not of a high order, but is distinctly inferior to that of the common domesticated mammals.

Social relations of birds. In aërial birds (except the cuckoos) the male and female pair, build a nest, and both take part in the incubation of the eggs and the feeding of the young. Usually a pair once mated remain mated for life and are very devoted to each other. In wild land birds the pairing habit is not of advantage to a species, but still the tendency to single matings is very strong. When land and water birds are domesticated man tries to break them of this habit because the males produce no eggs and he prefers to eat them while they are young and their flesh is tender. But, as will appear in detail when the different species of birds of this class are described, he does not always succeed in doing this. Even the domestic fowl and duck, in which pairing has been prevented for centuries, often show a strong tendency to pair; and the females with broods of young usually separate from the flock until the

little ones no longer need their care. With this separate family life there is still in most species of birds concerted action by communities in migrations, in forming colonies, in attacks on other creatures, and in defense from enemies. From the earliest times of which we have knowledge the devotion of birds to their mates and to their young has afforded the most common and most beautiful illustration of family life in nature.

Place of birds in domestication. The place of birds among domestic animals corresponds to that of garden vegetables, small fruits, and flowers among cultivated plants. The great staple agricultural crops — corn, wheat, oats, barley, hay, apples, oranges, horses, cattle, sheep, hogs, etc. — are produced mostly by men who make farming and stock-growing their business. But, while large quantities of garden vegetables, small fruits, flowers, poultry, pigeons, etc. are grown by people who specialize in them, the greater part of the supply in all lands comes from small gardens and small flocks on ordinary farms and in the back yards of town homes.

Uses of birds in domestication. With the exception of the cage birds and the ostrich, all our domestic birds are valuable for their flesh ; but, as some kinds can be produced more easily and cheaply than others, people growing birds for the table give most attention to those that can be grown most profitably, and the others are grown principally by those who prize them for rarity, beauty, or some peculiar quality.

The eggs of all birds are edible, but birds differ greatly in the number of eggs that they lay and in the disposition to lay them in places provided for the purpose. So, nearly all who keep birds for their eggs keep fowls, which are the most prolific and most docile, and hens' eggs are the staple eggs in the markets.

The feathers of birds are used for pillows and beds, for feather dusters, and in various ways for ornament. Except in the case of the ostrich, however, the value of the feathers of domesticated birds is so small that no one grows birds primarily for their

feathers. On the other hand, those who keep birds for pleasure find their greatest enjoyment in breeding them with colors and markings difficult to produce. Choice specimens of fancy-bred birds bring prices many times greater than the value of their flesh and eggs for food and of their feathers for use or ornament. Fancy feathers have no more value than others except on the living birds.

While those who keep birds for pleasure nowadays give most attention to breeding fancy stock for exhibition, several kinds of pigeons are kept to entertain by their flying performances; and — outside of the limited class of those who breed them especially for exhibition — canaries are valued according to ability to sing. The brutal sport of cockfighting was a popular pastime with our ancestors until prohibited by law, and is still prevalent in many lands. In early times birds of prey were captured when very young and carefully trained to hunt for their masters. Under the feudal system there were regulations prescribing the kinds of birds which different classes of men might use in this way: the eagle and vulture were for emperors only; the gyrfalcon for kings; the lesser falcons for nobles; the harrier for esquires; the merlin for ladies; the goshawk for yeomen; the kestrel for servants; the sparrow hawk for priests.

Much of the value of various kinds of poultry comes from their ability to destroy insects which damage vegetation, and to maintain themselves on these and on foods not available for the larger domestic mammals. The services of poultry in this respect being limited to those insects that can be secured from the ground, and to areas on which the birds can live safely and do no damage to crops, we are dependent upon wild aerial birds to keep insect life in check on trees and high bushes and on land not occupied by poultry.

Place of wild birds in civilization. As no insect-eating aerial birds have been domesticated, the preservation of wild birds that destroy insects is of as much importance to man as the

production of domestic birds. Indeed, the wild birds are much more valuable to us in the wild state than they would be if domesticated.

In nature species prey upon each other — the lowest forms of life upon inorganic and decayed matter, the higher forms upon the lower, the larger creatures upon the smaller, the savage upon the defenseless. Fertile lands not only produce luxuriant vegetation but teem with insect life, which, if not kept in check, would soon destroy that vegetation. In tropical and semitropical regions there are mammals, some of them quite large, which feed upon insects. In temperate regions where insects are not to be obtained during the winter, there would be no adequate check upon their increase and the consequent destruction of vegetation if it were not for the vast numbers of insect-eating migratory birds which come to these regions for the summer. Necessary as these birds are to vegetation on uncultivated lands, they are more necessary in cultivated fields, orchards, and gardens where the crops are more attractive to insects than the mixed vegetation on wild lands. As insect destroyers the domestic birds that are kept on cultivated lands only fill the place of the nonmigratory wild birds that have been driven away or exterminated. So it is to the interest of every one to protect insect-eating wild birds, for although these birds may do some damage to crops, their service usually more than pays for it.

Classes of domestic birds. There are three classes of domestic birds — poultry, pigeons, and cage birds. The poultry class comprises land and water birds and contains nine kinds — fowls, ducks, geese, turkeys, guineas, peafowls, pheasants, swans, and ostriches. The pigeon class has but one kind, the pigeon, which is the only aerial bird domesticated for economic purposes. The cage-bird class has as its most important representative the canary. The other birds of this class have never been popular in America.

The question of increasing the number of species of birds in domestication interests many people. There is a general impression among those not familiar with the commercial aspect of aviculture that many more species might be domesticated. While it is true that many birds capable of domestication have not been domesticated, there are few of these that would serve any purpose not better served by some species already domesticated. It will be shown as the different kinds and varieties of domestic birds are discussed that the most useful kinds are always the most popular, and that many others are kept principally as ornaments. The number of ornamental creatures that can be kept in domestication is limited, for as a rule animals, like people, must earn their living.

CHAPTER II

CHARACTERS AND HABITS OF BIRDS RELATED TO USE

Feathers. The feathers of a bird are the most highly developed form of protective covering in animals, serving other important functions in addition to the primary one. Compared with the hair of a mammal or the scale of a fish or of a reptile, a typical soft feather from the body of a bird is a very complex structure, partaking of the characters of both scales and hair. The fact that birds have scales and hair as well as feathers shows their relation to these other forms of animal covering. This is best observed on a fowl. The legs of a fowl are normally smooth, with scales on the front of the shank and on the upper surfaces of the toes. In feather-legged fowls the feathers appear first along the outer sides of the shanks and toes. As the number of feathers is increased they grow longer and more feathers appear, until in the most heavily feathered specimens the soft skin is covered and the scales are almost hidden.

The face of a fowl is normally almost bare, the skin being a bright red like the comb and wattles ; but at a distance of a few feet we can usually see some very small, fine feathers on it, and if we examine closely we see in addition still finer growths — hairs. Among the body feathers of a fowl, too, are quite long hairs. These are most easily observed after a bird is plucked. They do not come out with the feathers, and are removed by singeing.

Structure of feathers. The smallest feather that to the naked eye appears as something more complex than a hair, looks like a little bunch of fuzzy filaments. This is called down.

In the next higher form of feather a small round quill appears with filaments protruding from it like the hairs in an artist's

brush. Such a feather is called a stub feather, or simply a stub. The best place to find these is on the outside of the shank of a fowl with scantily feathered legs.

The first form of the complete feather is best observed either on the head of a fowl or at the hock joint. The feathers in these places are very small, yet complete. The round quill is lengthened into a shaft. Extending from each side of this shaft is a single row of filaments, called barbs, the edges of which, interlocked with little hooks, form the web of the feather. On other parts of the body of the bird the feathers are larger, but the general structure is always the same. The size and special structure of the feather are always adjusted to suit the part on which it grows or the service which it has to perform.

As the first function of the feathers is to keep the bird dry and warm, the body feathers are all soft as compared with the large stiff feathers of the wings and tail; yet as we look at the feathers on different parts of the body of a bird we notice differences in their structure, and also notice that the structure of a feather is not always the same throughout its length. On the exposed parts of the feathers of the neck, back, wings, and breast the web is perfect and the feathers overlap so closely that they present a smooth surface. Under the surface, especially next the skin, the barbs are not smoothly joined, but are fluffy. Thus the same feathers which present a hard, smooth surface to the weather provide a soft, warm garment next the skin. Under the wings and on the underside of the body the feathers are quite fluffy throughout their whole length.

Arrangement of the feathers. As you look at a living bird the feathers appear to grow on all parts of the body. When the feathers are removed from the bird you see that while the skin is nearly all rough, with the little elevations where the feathers were removed, there are quite large areas where the skin is perfectly smooth, showing that no feathers grew there. These places are bare because feathers on them would interfere with

the movements of the bird. The feathers on adjacent parts give the smooth areas sufficient protection.

Decorative feather forms. The natural decorative forms of plumage are found mostly in male birds and consist of extraordinary developments of the plumage of the neck and back, where the male birds of some species always have feathers differing in form from the feathers on the same parts of the female. When a feather appendage not common to a species is developed on some varieties, as the crest and beard on fowls and the ruff on pigeons, both sexes have it. The most interesting feather decorations will be described particularly in the chapters on the species on which they occur.



FIG. 1. Brown Leghorn chick
(one day old)

Color in feathers. While colors in the plumage are distributed very differently in different species of birds, often making combinations peculiar to a species, there is in all the same wonderful formation of patterns,

that depends for its effect in a section upon some overlapping feathers being marked alike and others having a different marking; and for the effect in a single feather, upon adjacent barbs being now alike, now different, in the distribution of the pigment in them. The best common example of a pattern covering a series of feathers is found on the wing of a Mallard Duck or of a Rouen Duck. Interesting examples of the formation of patterns on a single feather may be found in the plumage of barred, laced, and penciled fowls, and also in the lacings on the body feathers of the females of the varieties of ducks mentioned. Perhaps the most interesting illustrations of this kind, however, are to be seen on the plain feathers of the guinea and the gorgeous tail of the peacock.

The pigment which colors the plumage may be found in soluble form in the quills of immature colored feathers. It is not conspicuous unless it is quite dark. In black fowls it is often so abundant that a part remains in the skin when the feathers are removed. After the pigment is deposited in the web of the feather the color is fast. Water does not affect it, but it fades a little with age and exposure. New plumage usually contains a great deal of oil, a condition which is most conspicuous in white birds, to whose plumage the oil gives a creamy tint. In colored birds the presence of a large amount of oil in feathers is desirable because it gives greater brilliance to the plumage.



FIG. 2. White Leghorn chicks (ten days old)

Growth and molting of feathers. The first covering of a young bird is down. The young of birds which nest on the ground have the down covering when hatched; others acquire it in a few days. In small land birds which feather quickly, as Leghorn and Hamburg chicks, the largest wing feathers may have started to grow before the chick leaves the egg. In most kinds of poultry, however, the young show no signs of feathers for some days. The down is gradually replaced by small feathers, and these by larger feathers as the bird grows. As feathers in all stages of growth are found on the young bird at the same time, it is not known whether all feathers are molted the same number of times. In cases where some feathers were marked and watched, or where the colors changed with the changing feathers, it appeared that after the down three sets of feathers

were grown in succession, the third and last making the adult plumage of the bird. This coat remains until the following summer or fall, when it is molted and replaced by a new one.

Flight. The habit of flying is objectionable in domestic birds because it makes them more difficult to control. It has no direct use except in pigeons kept for flying. There is, however, a very important connection between development for flying and the value of birds for the table. The muscles of the wings furnish the greater part of the edible meat of most birds. The most desirable birds for food purposes are those which have the wing muscles well developed, yet not quite strong enough to enable them to fly easily. In such birds the breast meat remains comparatively soft through life, while in birds that fly well it becomes hard in a very short time. That is why the breast meat of the pigeon is relatively tougher in an old bird than the breast meat of a fowl or turkey.

The balance between capacity for flight and neglect to use it, which is desired in birds grown for the table, is secured by giving them opportunity to exercise their wings moderately but not for progressive practice in flying, which would soon enable them to fly easily over the fences used to confine them. To regulate such exercise the perches for birds that roost are made low, or in an ascending series in which each perch after the first is reached from the one below it, while fences are made so much higher than the distance the bird is accustomed to fly that the failures of its first efforts to go over them discourage it. Ducks and geese, which do not roost, flap their wings a great deal, and if they have room often exercise them by half running and half flying along the ground.

Mechanism of the wing. In its structure and in the muscular power that moves it, the wing of a bird is a wonderful piece of mechanism. A bird in flying strikes the air with its wings so rapidly that the movements cannot be accurately counted. The heron, which is a slow-flying bird, makes from one hundred

twenty to one hundred fifty downward strokes of its wings a minute. As each downward stroke must be preceded by an upward stroke, this means that the wings make from two hundred forty to three hundred separate movements a minute. In such swift-flying birds as the pigeon the movements of the wings can be distinguished but cannot be counted. The fastest movements of the wings are not made by the swiftest fliers. In order to fly at all some land birds with comparatively small wings have to move them so fast that the movements make a blur and a whirring noise. The partridge is an illustration of a bird of this class.

If the supporting surface of the wing of a bird were made of skin, like the web of the foot of a swimming bird, it would be necessary to fold the wing for each upward stroke. It is here that the structure of feathers adapts itself to the rapid action required for movement in the air. The wing is not one surface but a series of narrow surfaces lapping in such a manner that they unite to form one broad surface when the downward stroke is made, and with the upward stroke are separated so that the air passes between them. Greater power in the downward stroke and less resistance in the upward stroke are also secured by the curvature of the wing. The under side is concave, the upper side convex. Thus in the downward stroke the wing gathers the air under it and so increases the pressure, while in the upward stroke it scatters the air and reduces the pressure.

If the wing were equally rigid throughout, the movement of the bird would be mostly upward. The bird in flying moves forward because the front of the wing is rigid and the tips of the feathers, which are directed backward, are flexible. So the air compressed by the wing in the downward stroke escapes backward, and in doing so propels the bird forward. The principle is the same that is applied in the screw propeller of a boat or an airship, except that the wing vibrates while the propeller revolves.

The most important function of the tail in flight is to balance the bird. It is of some assistance in steering, but a bird steers its course mostly by manipulation of the wings.

Scratching. With the exception of the aquatic birds and the ostrich, all the species of poultry belong to the group called by naturalists *Rasores* or *Scratchers*. Birds of this class have legs of moderate length and very strong, with toes terminating in a stout claw. Normally they have three toes upon which the foot rests when they are standing on a flat surface, and a fourth toe, like a thumb, which assists the other toes to grasp a perch. Some individual birds and some races of birds have the fourth or hind toe double. The leg of a bird is so constructed that when it is bent as the bird sits on a narrow support the toes contract and grasp the support and hold it without any effort on the part of the bird. Thus the bird is as secure in its position on a limb when asleep as if wide awake and looking out for itself.

In proportion to their ability to scratch, birds are able to find seeds and insects concealed among dead or living vegetation on the surface of the ground, and also to dig below the surface. Scratching capacity is most highly developed in the fowl. Compared to it the other land birds are very feeble scratchers, and do little damage by scratching if free to roam about. For ages the scratching propensity of fowls was regarded as a vice in them, but since people began to give special attention to poultry they have learned that fowls are much more contented and thrifty in confinement if their food is given them in a litter of leaves, straw, or shavings, in which they must scratch for it, and have also found that to some extent fowls may be used to cultivate crops while destroying insects and weeds among them.

Swimming. Capacity for swimming has an economic value in domestic birds because it adapts those possessing it to places which land birds rarely frequent. It will be shown when the different kinds of aquatic birds are described that each has its special place and use in domestication.

The swimming faculty in these birds is of further interest because of its relation to the development of the body plumage. If a land bird is placed in the water, the feathers are quickly saturated, the water penetrating to the skin. A duck or other swimming bird will remain in the water for hours without the water penetrating the feathers. This is commonly supposed to be due to the presence of a large amount of oil in the feathers, but the difference in the oiliness of the feathers of fowls and of ducks is not great enough to account for the difference in resistance to the penetration of water. The peculiar quality of the plumage of swimming birds is its density. If you take up a fowl and examine the plumage you will find that it is easy to part the feathers so that the skin can be seen. It may be done with the fingers, or even by blowing gently among the feathers with the mouth. Now try to separate the feathers of a duck so that the skin will be visible. You find it much harder, because the feathers are so thick and soft and at the same time so elastic. The familiar phrase "like water from a duck's back" is not especially appropriate. The feathers on the back of most birds are a very effective protection against rain. The feathers all over a duck are such poor conductors of water that it is hard to remove them by scalding. The structure of the plumage of swimming birds adds to their buoyancy in the water. They do not have to exert themselves to remain on the surface, but float like cork.

Foods and mode of digestion. All kinds of poultry and most of our common wild birds are omnivorous eaters, but the proportion of different foods usually taken is not the same in different kinds of birds. Some eat mostly grains, some mostly animal foods. Some can subsist entirely on grass if they can get it in a tender state; others eat very little grass. The scratching birds like a diet of about equal parts of grain, leaves, and insects. Pigeons and canaries live almost entirely on grains and seeds, but like a little green stuff occasionally.

Domestic birds which produce many eggs require special supplies of food containing lime to make the shells. Until within a few years it was universally believed—and it is still commonly supposed—that birds needed grit to take the place of the teeth nature did not give them, and assist in the grinding of the food in the gizzard. Many close observers now reject this idea because they find that birds supplied with digestible mineral foods do not eat those that are not digestible. A bird does not need teeth to grind its food, because it is softened in the crop and the gastric juice acts upon it before the grinding process begins.

Peculiarities of birds' eggs. The only animal foodstuff produced in a natural package, easily preserved and handled, is the egg. In the vegetable world we have a great many such things—fruits, seeds, roots, nuts, with coverings of various textures to protect the contents from the air. In all of these the material stored up is either for the nourishment of the seeds in the first stages of growth as plants, or for the nourishment of a new or special growth. An egg is the seed of an animal. All animals produce eggs, but in mammals the new life originating from the egg goes through the embryonic stages within the body of the parent, while in insects, fishes, reptiles, and birds the egg is laid by the creature producing it before the embryo begins to develop.

In mammals the embryo grows as a part of the body of the parent, the substances which build it up coming from the parent form as they are needed. In birds a tiny germ—the true egg—is put, with all the material needed for its development as an embryo, in a sealed package, which may be taken thousands of miles away from the parent, and, after lying dormant for weeks, may begin to grow as soon as the proper conditions of temperature are applied. The food value of the germ of an egg is inappreciable. We use the egg to get the material stored up in it for the young bird which would come from the germ.

Development of the egg. The method of the formation of an egg is very interesting. It is the same in all birds, but is most conveniently studied in fowls. If a laying hen is killed and the body is opened so that the internal organs can all be seen, one of the most conspicuous of these is a large, convoluted duct having its outlet at the vent. In this duct, which is called the oviduct, are eggs in various stages of formation. At its upper extremity, attached to the backbone, is a bunch of globular yellow substances which are at once identified as yolks of eggs in all sizes. The organ to which these are attached is the ovary. The smallest yolks are so small that they cannot be seen without a powerful microscope. These yolks are not germs, but as they grow the germ forms on one side of each yolk, where it appears as a small white spot.

When a yolk is full-grown it drops into the funnel-shaped mouth of the oviduct. Here it is inclosed in a membranous covering, called the chalazæ, and receives a coating of thick albumen. The function of the chalazæ is to keep the yolk suspended in the center of the egg. It does not merely inclose the yolk, but, twisted into cords, extends from either end and is attached to the outer membrane at the end of the egg.

After leaving the funnel the egg passes into a narrow part of the oviduct, called the isthmus, where it receives the membranous coverings which are found just inside the shell. From the isthmus it goes into the lowest part of the oviduct—the uterus. Here the shell is formed, and at the same time a thin albumen enters through the pores of the shell and the shell membranes and dilutes the thick albumen first deposited. After this process is completed the egg may be retained in the oviduct for some time. It is, however, usually laid within a few hours.

Rate and amount of egg production. In the wild state a bird, if not molested after it begins laying, produces a number of eggs varying in different kinds, according to the number of young that can be cared for, and then incubates them. If its

first eggs are removed or destroyed, the bird lays more, usually changing the location of its nest. In domestication the eggs of most kinds of birds are removed from the nests daily as laid, and the birds lay many more eggs before they stop to incubate than they do in the wild state.

It is, and has been for ages, the common opinion that the wild birds and poultry, when first domesticated, were capable of laying only a small number of eggs each season, and that laying capacity has been enormously increased in domestication ; but the oldest reports that we have of the amount of egg production indicate that the laying capacity of fowls was as great centuries ago as it is at the present time. Recent observations on wild birds in captivity show that even birds which pair and usually lay only a few eggs each season have a laying capacity at least equal to the ordinary production of hens. Quails in captivity have been known to lay about one hundred eggs in a season, and an English sparrow from which the eggs were taken as laid produced over sixty.

The constitutional capacity to produce ovules is now known to be far greater than the power of any bird to supply the material for the nourishment of germs through the embryonic stage. The principal factors in large egg production are abundance of food and great capacity for digesting and assimilating it.

Incubation. A bird before beginning to lay makes a nest. Some birds build very elaborate and curious nests ; others merely put together a few sticks, or hollow out a little place on the ground. In birds that pair, the male and female work together to build the nest. Even in polygamous domestic birds like the fowl and the duck, a male will often make a nest for the females of his family and coax them to it as a cock pigeon does his mate.

If the birds are left to themselves and the eggs are not molested, an aerial bird will usually lay a number of eggs equal to the number of young the parents can feed as long as they require this attention, while a terrestrial or aquatic bird will usually lay

as many eggs as she can cover. The desired number of eggs having been laid, the process of incubation by the parents begins.

The incubation of their eggs by birds is one of the most remarkable things in nature. We say that "instinct" leads birds to build their nests and to keep their eggs warm for a period varying from two weeks for small birds, to six weeks for the ostrich; but "instinct" is only a term to describe the apparently intelligent actions of the lower animals, which we say have not intelligence enough to know the reasons for the things that they do.

The mother of a young mammal knows that it came from herself, and she can see that it is like her and others of her kind. It at once seeks her care and responds to her attentions.



FIG. 3. Sitting hen

The egg which a bird lays is as lifeless — to all appearances — as the stones which it often so closely resembles. Only after many days or weeks of tiresomely close attention does it produce a creature which can respond to the care lavished upon it. The birds incubating eggs not only give them the most unremitting attention, but those that fill their nests with eggs before beginning to incubate methodically turn the eggs and change their position in the nest, this being necessary because otherwise the eggs at the center of the nest would get too much heat and those at the outside would not get enough. A bird appears to know that if she begins to sit before she has finished laying, some of the eggs would be spoiled or would hatch before the others; and, as noted above, aerial birds seem to know better than to hatch more young than they can rear. But no bird seems to have any idea of the time required to hatch its eggs, or to notice the lapse of time, or to care whether the eggs upon which it sits are

of its own kind or of some other kind, or to know whether the young when hatched are like or unlike itself. If eggs fail to hatch, domestic birds will, as a rule, remain on the nest until the

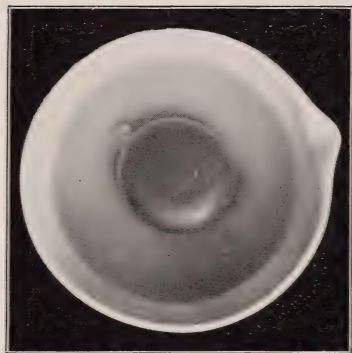


FIG. 4. Fresh egg¹



FIG. 5. Infertile egg (after twenty-four hours' incubation)

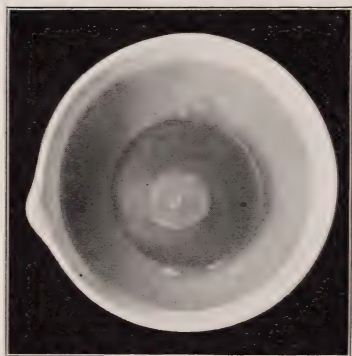


FIG. 6. Fertile egg (after twenty-four hours' incubation)



FIG. 7. Embryo (after seventy-two hours' incubation)

eggs are taken away or until sheer exhaustion compels them to abandon the hopeless task. In domestication, however, those birds which continue laying most freely when their eggs are removed as laid, tend to lose the habit of incubation. Turkeys and

¹ Photographs (Figs. 4-8) from Bureau of Animal Industry, United States Department of Agriculture.

geese will often begin to incubate after having laid about the number of eggs that they could cover. Many fowls will do the same, but most fowls lay for several months before attempting to incubate, and in many races not more than two or three per cent of the hens ever incubate.

Development of the embryo in a bird's egg. The condition required to produce a live bird from a fertile egg is the continuous application of a temperature of about 102 or 103 degrees



FIG. 8. Embryo (after seven days' incubation)



FIG. 9. Chick ready to break shell

Fahrenheit from the time the heat is first applied until the embryo is fully developed and ready to emerge from the shell. In nature the heat is applied by contact with the bodies of the parent birds. Development of life will start in an egg at about 10 degrees below the temperature required to maintain it, but at this temperature the germ soon dies. The temperature in incubation may occasionally go higher than 103 degrees or may be as low as 70 degrees for a short time without injury to the germ. Some germs will stand greater extremes of temperature than others, just as some living creatures will.

The first stages of the development of life in the egg of a bird may be observed by holding the eggs before a strong light in a darkened room. White-shelled eggs are the best for this

purpose. In about thirty-six hours from the beginning of incubation it will be found that the germ has turned red, and little red veins radiate from it somewhat like the legs of a spider. For



FIG. 10. Egg before exclusion and partially excluded chick

several days the egg is quite translucent and the yolk shows plainly. As the germ grows, the contents of the egg become clouded and dense, and the air space at the large end of the egg is clearly defined, the

density being greatest near it. From the time that the egg becomes dense, observations of development must be made by breaking one or more eggs daily or every few days, according to the number available for observation.

The embryo grows until it fills the egg. The mere application of heat to the egg has gradually transformed that little germ and the yellow and white of egg into bones, flesh, skin (and, in some cases, down), and all the organs of a living creature. When the embryo has filled the shell, it lies curled up, usually with the head at the large end of the egg and the beak almost touching the shell, at about one third of the distance from the large to the small end of the egg. At the point of the beak of the young bird on the curved tip of the upper mandible is a small horny scale. Without this scale it would be hard for the embryo to break the shell because it



FIG. 11. Light Brahma (day old)

cannot, as it lies, strike it a direct blow with the point of its beak. This scale is a remarkable character. Its only use is to help the bird out of the shell. A few days after exclusion it disappears.

If you take a hen's egg about the eighteenth or the nineteenth day of incubation and hold it closely in your hand, you may be able to feel the chick move. If your hand is a little bit cold, the chick is much more likely to squirm in the egg and may utter a peep. If, with the egg in a warm hand, you hold it to your ear, you will about this time hear an occasional tap, tap, caused by the chicken striking its beak against the shell. The tapping is kept up more or less steadily until the shell cracks where the point of the beak strikes it and a little piece is broken out. The chick usually rests awhile now, — perhaps for some hours, — then resumes the attack on the shell. It turns in the shell, breaking out little pieces as it turns, until there is a crack nearly all the way around, when, by pushing with its head and feet, it forces the shell apart and sprawls out of it.

The process is the same for all birds, except that those that take longest to develop in the shell take a longer rest after first breaking it. The young of aerial birds, which are naked when hatched, are ugly little things. Young poultry, too, are almost repulsive with their sprawling forms and the wet down plastered to the skin, but in a few hours they grow strong, the down dries and becomes fluffy, the bright little eyes seem to take in everything, and they are the most attractive of all baby animals.

CHAPTER III

SPECIES AND THEIR DIVISIONS IN DOMESTIC BIRDS

The three general classes of domestic birds include few species but many varieties, and, outside of the distinct varieties, an indefinite number of individual types. Where varieties are as numerous as in the fowl, which has about three hundred, and the pigeon, which has a much greater number, the differences between them are often very slight. Sometimes the form of a single small character is the only distinguishing feature. But, if this is a fixed character, the variety is distinct. Where there are so many varieties it is hard to make short, appropriate descriptive names for all, if considered simply as varieties. For such diversity there must be a more extended classification. Such a classification, growing gradually with the increase in the number of varieties, will not be consistent throughout. Hence to understand clearly the relations of the artificial divisions of species in domestication we must know what a species is and how these divisions arise.

Definition of species. Species are the natural divisions of living things. Each plant and animal species retains its distinctive character through long ages because the individuals composing it can produce perfect offspring only (if asexual) of themselves, or (if bisexual) with others of their species.

The self-isolation of species is well illustrated when similar plants grow together, as grasses in the same field and practically on the same spot; yet year after year all the old kinds are found and no new ones such as might come from a mixture of two kinds, if they would mix. In the higher animals, where the parent forms are of different sexes, they choose mates of their

own kind, and so each species remains distinct; but if in a species there are many different types, such as we find in domestic fowls, the members of the species, when free to do so, mate as readily with types quite different from their own as with individuals exactly like them, and produce offspring of intermediate types with all the essential characters of the species. In domestication individuals of distinct yet similar species are sometimes mated and produce offspring called hybrids, but these are sterile. The mule, which is a hybrid between the ass and the mare, is the most familiar animal of this kind. Hybrid, or mule, cage birds are produced by crossing the canary with several allied species. Among other domestic birds hybrids are almost unknown.

Origin of species. Until near the close of the last century it was commonly believed that each species had been created in perfect form and that species were unchangeable; but long before that time some keen students of the natural sciences and close observers of the changes that take place in plants and animals in domestication had discovered that species were not perfectly stable and were changing slowly. Geologists established the fact that the earth, instead of being only a few thousand years old, had existed for countless centuries. Among fossil remains of creatures unlike any now known they had found also other forms which appeared to be prototypes of existing species. The idea that the forms of life now on the earth had come from earlier and somewhat different forms had occurred to several scientists more than a hundred years ago, but it was not until about 1860 that a satisfactory explanation of progressive development of forms of life was given to the world. This mode of creation is called evolution.

The theory of evolution is that partly through their own inherent tendency to vary and partly through the influence of external things which affect them, all organisms change slowly; that things of the same kind, separated and living under different

conditions, may in time so change that they become separate species; and that this process may be repeated indefinitely, the number of species constantly increasing and becoming more diversified and more highly developed.

Such a theory would not be entitled to serious consideration unless it was known that the earth was millions of years old, because we know that races of fowls separated for over three thousand years (and perhaps twice as long) and developed into quite different varieties will breed together as readily as those of the same variety. But when it is certain that the earth is so old that there has been ample time for changes in living forms that would require periods of time beyond our comprehension, some of the relations of varieties and species of birds have an important bearing on the theory of evolution.

As in the case of fowls just noted, we find that domestic ducks of the same species, after a separation of several thousand years, breed freely together. But our domestic ducks are not, like the fowls, all of the same species, and if individuals of different species are paired they produce only a few weak hybrids. Our domestic geese are probably descended from two wild varieties, but races that were not brought together for thousands of years after they were domesticated are perfectly fertile together, while when mated with the American Wild Goose, which is not domesticated but will breed in captivity, they produce only hybrids. The general resemblance between geese and ducks is very striking, yet they will not breed together at all.

A comparison of these facts indicates that while three thousand, or even five or six thousand, years of separation may not be enough to break down the natural affinity of varieties of the same species, separation and difference of development will eventually make of varieties distinct species, a union of which will produce only hybrids, while a longer separation and further increase of differences makes the break between the species absolute and they will not breed together at all.

Natural varieties. A species having developed as a variety of an earlier species will continue to develop as one variety or as several varieties, according to conditions. If a part of a species becomes so separated from the rest that intercourse ceases, each division of the species may become a well-defined variety.

Varieties in domestication. How a species when domesticated breaks up into varieties is well illustrated by the case of the fowl. The original wild species has long disappeared, but there is good reason to suppose that in size and color it was something between a Brown Pit Game and a Brown Leghorn. The birds were smaller than most fowls seen in this country today. The prevailing color was a dull brown, because that color best conceals a small land bird from its enemies. Fowls that were domesticated and given good care and an abundance of food would usually grow larger than the wild stock. Thus if any person, or the people generally in any community, systematically gave their fowls good care, a variety of unusual size would be developed.

Different colors would also appear in the flocks of fowls, because the birds of unusual colors would be protected and preserved, instead of being destroyed as they usually are in the wild state. Other peculiarities, too, such as large combs, crests, and feathered legs, would be developed in some lands and neglected in others. This is how it happened that after thousands of years in domestication the races of fowls in different parts of the world were quite different in size and form, but alike in being of many colors.

From a species in this condition modern poultry breeders have made hundreds of distinct varieties. The easiest method of making a variety in domestication is to select specimens for breeding as near the desired type as possible, and to breed only from a few individuals in each generation which come nearest to the ideal type. In this way a variety that breeds quite true to the type may be established in from three or four to eight or

ten years, according to the number of characters to be established as distinctive of the variety. Varieties are also made by crossing unlike individuals. This process is longer than the other, and sometimes requires a series of crosses to produce specimens approximating the ideal sought. After such specimens have been obtained the method is the same as in the first case. A variety is commonly considered to be well established when the greater part of the specimens produced are easily identified as of that variety. But no domestic variety is ever established in the sense that a species is. All are artificial, produced by compulsory separation and preserved only as long as it is continued.

Classification of domestic varieties of birds. Domestic varieties of all kinds of live stock were at first mostly shape-varieties; that is, the individuals of a variety were alike in shape but of various colors. This is the case still with some varieties. These shape-varieties are mostly the common types of certain countries or districts. Thus the Leghorn fowl is the common fowl of Italy, and the Houdan is a type common in a small district in France. Such shape-varieties are called *breeds*. When other types were made by crossing such breeds they also were called breeds.

When people first began to be interested in the improvement of live stock, the popular idea of a breed was that it was a domestic species, and there are still many people who hold this view. This popular misconception of the nature of a breed is responsible for much of the inconsistency and confusion in the ordinary classifications of domestic varieties. To it also is due the use of the term "variety" to apply especially to color-varieties, which are the principal divisions of breeds.

In the classification of domestic birds a *variety* is properly a color-variety of a breed. Thus in the Plymouth Rock breed there are six color-varieties — barred, white, buff, partridge, silver penciled, and ermine (called Columbian); and in Fantail Pigeons

there are six color-varieties — white, blue, black, red, yellow, and silver. Birds of the same breed (shape) and the same variety (color) may differ in some other character, as the form of the comb or the presence or absence of feathers in certain places. In accordance with such differences varieties are divided into *subvarieties*. Thus, in Leghorn Fowls the brown, white, and buff varieties have single-combed and rose-combed subvarieties.

In any breed, variety, or subvariety certain families are sometimes distinguished for general or special excellence of form or color. Such a family is called a *strain*.

Systematic mixtures of breeds and varieties. Although so many distinct varieties have been developed from common domestic stocks, the improved races do not always displace the mongrels. When the old mongrels disappear their place is often taken by a new mongrel stock produced by mixtures of the distinct breeds with each other and with the old mongrel race. The greater part of such stock is so mixed that its relation to any established breed could not be determined or expressed, but systematic mixtures are sometimes made, and to describe these the following terms are used: *Crossbred*—having parents of different, distinct breeds, varieties, or subvarieties. A Leghorn male mated with a Cochin female produces offspring each of which is in blood one half Leghorn and one half Cochin. *Grade*—having more than half of the blood of a breed.

If the offspring of a cross such as is described in the preceding paragraph are mated with birds of one of the parent breeds, the offspring of this mating will have three fourths of the blood of that breed. If these in turn are mated to birds of the same pure breed, the offspring will have seven eighths of the blood of that breed. Animals bred in this way are called *grades* until the process has been carried so far that they are practically pure-bred. Mongrel stock is often graded up in this way. As a rule stock that is seven eighths pure is not distinguishable from average pure stock of the same breed.

Pure-bred, thoroughbred, and standard-bred. A *pure-bred* animal is, strictly speaking, one having the blood only of the variety to which it belongs. From what has been said of the making of breeds and varieties it is plain that absolute purity of blood is not a universal attribute of well-bred domestic birds. A *thoroughbred* animal is one that is thoroughly bred for some purpose or to some type. A *standard-bred* animal is one that is bred especially to conform to requirements agreed upon by breeders and exhibitors.

A great deal of misapprehension and confusion in the use of these terms has been caused by the attitude of those who maintain that the term "thoroughbred," having been used as a name for highly bred running horses, cannot properly apply to any other kind of live stock, and that "pure-bred" should apply to all thoroughly bred races. The noun "Thoroughbred" is the name of a breed of horses. The adjective "thoroughbred" is common property. Writers on aviculture who wish to be accurate prefer it in many instances to "pure-bred" because absolute purity of blood is rare and is not of the importance in breeding that novices usually suppose. Not only are many new varieties made by crossing, but in long-established breeds out-crosses are regularly made to restore or intensify characters.

To illustrate the use of the three terms in application to a single breed: A stock of Light Brahmas might be kept pure for half a century, yet at the end of that period might have changed its type entirely. It might be so deteriorated that it was worth less than common mongrels; yet it is pure-bred stock. Another stock of the same variety might be bred for table qualities, egg-production, and the same principal color-characteristics of the variety, but without attention to the fine points of fancy breeding. Such a stock is thoroughbred but not standard-bred.

CHAPTER IV

FOWLS

The most useful of all birds is the common fowl, seen on almost every farm and in the back yards of many city and village homes. The fowl takes to the conditions of domestic life better than any other land bird. It is more cleanly in its habits, more productive, more intelligent, and more interesting than the duck, which ranks next in usefulness. Fowls supply nearly all the eggs and the greater part of the poultry meat that we use. Their feathers are of less value than those of ducks, geese, and turkeys. In the days when feather beds were common they were made usually of the body feathers of fowls.



FIG. 12. Pet fowls — White Wyandottes and Game Bantams. (Photograph from Dr. J. C. Paige, Amherst, Massachusetts)

Now the feathers of fowls are used mostly for the cheaper grades of pillows and cushions, and in the making of feather boas and like articles. The wing and tail feathers have been



FIG. 13. Single-combed Rhode Island Red male¹

and with a little attention can easily be made very tame. If neglected and abused, they become shy and wild. The most striking peculiarities of the fowl are the fleshy comb and wattles which ornament the head, and the full tail which is usually carried well up and spread perpendicularly. The head appendages vary much in size and form. They are sometimes very small, but never entirely wanting. The carriage of the tail also varies, but except in a few breeds bred especially for low tails it is noticeably high as compared with that of other poultry. Fowls

much used for decorating ladies' hats, and since the use of small wild birds in millinery decorations has been prohibited, the hackle feathers of cocks are quite extensively used in trimming hats.

Description. Ordinary fowls are rather small land birds. The males at maturity weigh from four to five pounds each, and the females about a pound less. They are plump, rugged, and very active. If treated well they are bold,



FIG. 14. Rose-combed Rhode Island Red female¹

¹ Photograph from Lester Tompkins, Concord, Massachusetts.

are readily distinguished from other birds by the voice. The male crows, the female cackles. These are their most common calls, but there are other notes — some common to both sexes, some peculiar to one — which are the same in all races of fowls. An abrupt, harsh croak warns the flock that one of their number has discerned a hawk or noticed something suspicious in the air. A slowly repeated cluck keeps the young brood advised of the location of their mother. If she finds a choice morsel of food, a rapid clicking sound calls them about her. When she settles down to brood them she calls them with a peculiar crooning note. The male also cackles when alarmed, and when he finds food calls his mates in the same way that the female calls her young under the same circumstances. Other poultry and sometimes even cats and dogs learn this call and respond to it. If the food discovered is something that a stronger animal wants, the bird making the call may lose it because of his eagerness to share the treasure with the members of his family.

In adult fowls the male and female are readily distinguished by differences in appearance as well as by the voice. The comb and wattles of the male are larger, and after he has completed his growth are always of the same size and a bright red in color. In the female the comb is much smaller than that of a male of the same family, and both size and color vary periodically, the comb and wattles being larger and the whole head brighter in color when the female is laying. The tail of the male is also much larger than that of the female and has long plumelike coverts. The feathers of his back and neck are long, narrow, and flowing, and in many varieties are much brighter in color than the corresponding feathers on the female. The male has a short, sharp spur on the inside of each leg, a little above the hind toe. Occasionally a female has spurs, but they are usually very small. With so many differences between male and female the sex of an adult fowl is apparent at a glance. In the young of breeds which have large combs the males begin to

grow combs when quite small, and so the sex may be known when they are only a few weeks old. In other breeds the sex may not be distinguished with certainty until the birds are several months old, or, in some cases, until they are nearly full-grown.



FIG. 15. White Polish male (crowing) and female. (Photograph from Leontine Lincoln Jr., Fall River, Massachusetts)

The adult male fowl is called a *cock*, and also, in popular phrase, a *rooster*. The adult female fowl is called a *hen*. The word "hen" is the feminine form of *hana*, the Anglo-Saxon name for the cock. It is likely that the name "cock," which it is plain was taken from the first syllable of the crow of the bird, was gradually substituted for *hana* because it is shorter. *Hana* means "the singer." A young fowl is called a *chicken* until the

sex can be distinguished. After that poultry fanciers call the young male a *cockerel* and the young female a *pullet*. The word "pullet" is also used by others, but the popular names for a cockerel are *crower* and *young rooster*. The word "cockerel," as is seen at a glance, is the diminutive of "cock." The word "pullet," sometimes spelled *poulet*, is a diminutive from the French *poule*, "a hen."

Origin of the fowl. Of the origin of the fowl we have no direct knowledge. It was fully domesticated long before the beginnings of history. There is no true wild race of fowls known. For a long time it was commonly held that the *Gallus Bankiva*, found in the jungles of India, was the ancestor of all the races of the domestic fowl, but this view was not accepted by some of the most careful investigators, and the most recent inquiries into the subject indicate that the so-called *Gallus Bankiva* is not a native wild species but a feral race, that is, a race developed in the wild from individuals escaped from domestication.

Appearance of the original wild species. The likeness of the fowls shown in ancient drawings to the ordinary unimproved stock in many parts of the world to-day shows that — except as by special breeding men have developed distinct races — fowls have not changed since the most remote times of which records exist. From the constancy of this type through this long period it is reasonably inferred that no marked change in the size and shape of the fowl had occurred in domestication in prehistoric times, and therefore that the original wild fowl very closely resembled fowls which may be seen wherever the influence of improved races has not changed the ordinary type. The particular point in which the wild species differed from a flock of ordinary domestic fowls was color. Domestic fowls, unless carefully bred for one color type, are usually of many colors. In the wild species, as a rule, only one color would be found, and that would be brown, which is the prevailing color among small land birds.

Distribution of fowls in ancient times. From drawings and descriptions on ancient tablets and from figures on old coins it appears that the fowl was familiar to the Babylonians seven thousand years ago, and that it was introduced into Egypt about 4600 B.C. Chinese tradition gives 1400 B.C. as the approximate date of the introduction of poultry into China from the West. At

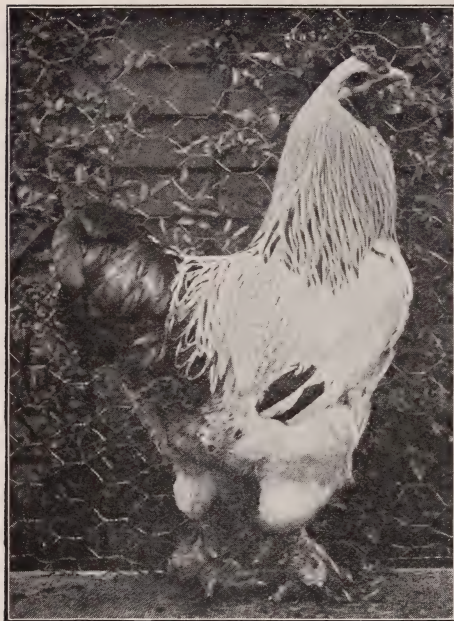


FIG. 16. Light Brahma cockerel

the time of the founding of Rome the fowl was well known throughout Northern Africa, and in the Mediterranean countries of Europe as far west as Italy and Sicily. It was also known in Japan at this time. Whether it was known in India is uncertain; if not, it was brought there soon after. It is supposed that immediately following their conquests in Central and Western Europe the Romans introduced their poultry into those regions. Thus, at about

the beginning of the Christian Era, the fowl was known to all the civilized peoples of the Old World and had been introduced to the less civilized races of Europe.

Development of principal races of fowls. There is no evidence that any of the ancient civilized peoples made any effort to improve the fowl, nor have any improved races been produced in the lands where those civilizations flourished. Outside of this area many different types were gradually developed to suit the needs

or the tastes of people in different countries and localities. Thus in the course of centuries were produced from the same original wild stock fowls as unlike as the massive Brahma, with feathered legs and feet, and the diminutive Game Bantam; the Leghorn, with its large comb, and the Polish, with only the rudiments of a comb and in its place a great ball of feathers; the Spanish, with monstrous development of the skin of the face, and the Silky, with dark skin and hairlike plumage. Except in a few limited districts these special types did not displace the ordinary type for many centuries. Until modern times they were hardly known outside

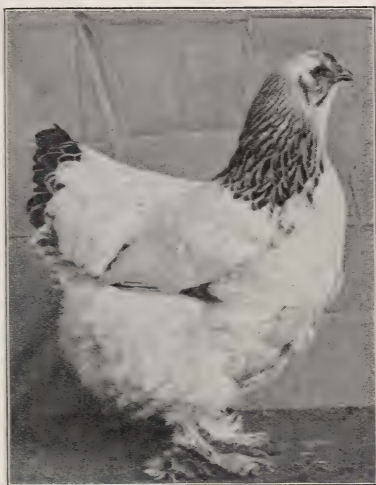


FIG. 17. Light Brahma hen



FIG. 18. Red Pile Game Bantam cock

of the districts or the countries where they originated. Of the details of their origin nothing is known. They were not of the highly specialized and finished types such as are bred by fanciers now. Their distinctive features had been established, but in comparatively crude form. The refining and perfecting of all these types has been the work of



FIG. 19. Red Pile Game Bantam hen

fanciers in Holland, Belgium, England, and America in modern times. These fanciers have also developed new races of more serviceable types.

How fowls were kept in old times. Less than a century ago it was quite a common practice among the cottagers of England and Scotland to keep their fowls in their cottages at night. Sometimes a loft, to which the birds had access by a ladder



FIG. 20. White-Faced Black Spanish cockerel
(Photograph from R. A. Rowan, Los Angeles,
California)

outside, was fitted up for them. Sometimes perches for the fowls were put in the living room of the cottage. Such practices seem to us wrong from a sanitary standpoint, but it is only within very recent times that people have given careful attention to sanitation, and in old times, when petty thieving was more common than it is now, there was a decided advantage in having such small domestic animals as poultry and pigs where they could not be disturbed without the owner's knowing it. The practice of keeping fowls in the owner's dwelling seems to have been confined to the

poorer people, who had no large domestic animals for which they must provide suitable outbuildings. On large farms special houses were sometimes provided for poultry, but they were probably oftener housed with other animals, for few people thought it worth while to give them special attention.

Throughout all times and in all lands the common domestic birds have usually been the special charge of the women and children of a household. In some countries long-established custom makes the poultry the personal property of the wife. A traveler in Nubia about seventy years ago states that there the

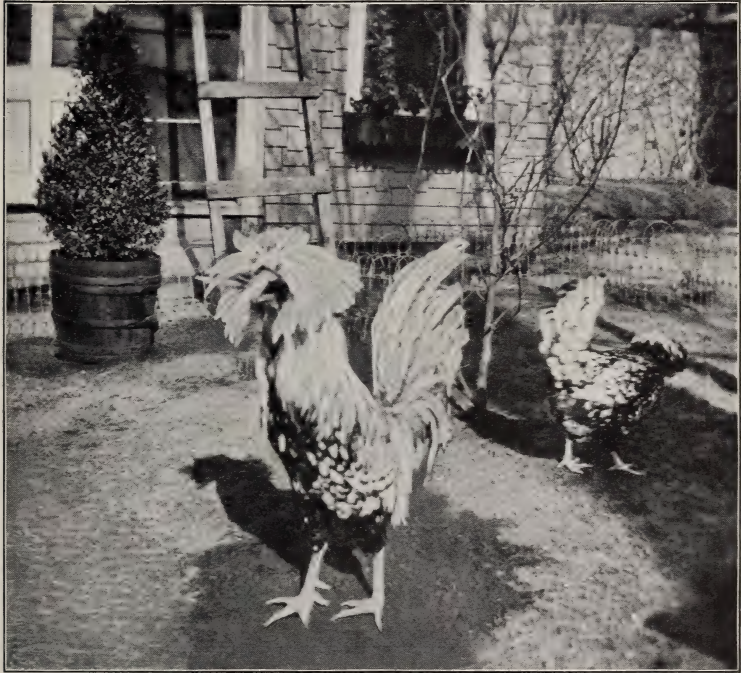


FIG. 21. Silver-Spangled Polish cock and hen. (Photograph from Leontine Lincoln Jr., Fall River, Massachusetts)

henhouse, as well as the hens, belonged to the wife, and if a man divorced his wife, as the custom permitted, she took all away with her.

The flocks of fowls were usually small in old times. It was only in areas adjacent to large cities that a surplus of poultry or eggs could be disposed of profitably, and as the fowls were almost always allowed the run of the dooryard, the barnyard,

and the outbuildings, the number that could be tolerated, even on a large farm, was limited. As a rule the fowls were expected to get their living as they could, but in this they were not so much worse off than other live stock, or than their owners. But, while this was the ordinary state of the family flock of fowls, there were frequent exceptions. The housewife who is thrifty



FIG. 22. Black Langshan cock. (Photograph from Urban Farms, Buffalo, New York)

always manages affairs about the house better than the majority of her neighbors, and in older poultry literature there are occasional statements of the methods of those who were most successful with their fowls, which we may well suppose were methods that had been used for centuries.

Modern conditions and methods. About a hundred years ago people in England and America began to give more attention to poultry keeping, and to study how to

make poultry (especially fowls) more profitable. This interest in poultry arose partly because of the increasing interest in agricultural matters and partly because eggs and poultry were becoming more important articles of food. Those who studied the situation found that there were two ways of making poultry more profitable. One way, which was open to all, was to give the birds better care; the other was to replace the ordinary fowls with fowls of an improved breed. So those who were much interested

began to follow the practices of the most successful poultry keepers that they knew, and to introduce new breeds, and gradually great changes were made in the methods of producing poultry and in the types of fowls that were kept in places where the interest in poultry was marked.

Nearly all farmers now keep quite large flocks of fowls. Many farmers make the most of their living from poultry, and in some places nearly every farm is devoted primarily to the production of eggs and of poultry for the table. Fowls receive most attention, although, as we shall see, some of the largest and most profitable farms are engaged in producing ducks. In the suburbs of cities and in villages all over the land many people keep more fowls now than the average farmer did in old times. These city poultry keepers often give a great deal of time to their fowls and still either lose money on them or make very small wages for the time given to this work, because they try to keep too many in a small space, or to keep more than they have time to care for properly.

The breeding of fancy fowls is also an important pursuit. Those who engage in this line on a large scale locate on farms, but many of the smaller breeders live in towns, and the greater number of the amateur fanciers who breed fine fowls for pleasure are city people.

On large poultry farms the work is usually done by men. There are many small plants operated by women. The ordinary



FIG. 23. Black Langshan hen. (Photograph from Urban Farms, Buffalo, New York)

farm and family flocks are cared for by women and children much oftener than by men, because, even when the men are interested in poultry, other work takes the farmer away from the vicinity of the house, and the city man away from home, so much that they cannot look after poultry as closely as is necessary to get the best results. Many women like to have the care of a small flock of fowls, because it takes them outdoors for a



FIG. 24. Pit Game cock. (Photograph from W. F. Liedtke, Meriden, Connecticut)

few minutes at intervals every day, and the eggs and poultry sold may bring in a considerable amount of pin money. Many boys, while attending the grammar and high schools, earn money by keeping a flock of fowls. Some have saved enough in this way to pay expenses at college for a year or more, or to give them a start in a small business. When there are

both boys and girls in a family, such outdoor work usually falls to the lot of a boy. A girl can do just as well if she has the opportunity and takes an interest in the work.

Native fowls in America. To appreciate the influence of improved races of fowls from various parts of the Old World upon the development of poultry culture in America, we must know what the fowls in this country were like when poultry keepers here began to see the advantages of keeping better stock, and must learn something of the history of the improved races in the countries from which they came.



FIG. 25. Dominique cockerel. (Photograph from W. H. Davenport, Coleraine, Massachusetts)

improved varieties came from some of these lands in early colonial times, but the only breeds that retained their identity sufficiently to have distinctive names were the Game Fowls, which came mostly from England, and the Dominiques (bluish-gray barred fowls which probably came from Holland or from the north of France, where fowls of this type were common).

The Game Fowls, being prized for the sport of cockfighting, were often bred with great care, but the Dominique fowls (also called cuckoo fowls and hawk-colored fowls) were mixed with other stock, and the name was commonly given to any fowl of

When we speak of native fowls in America we mean fowls derived from the stocks brought here by the early settlers. The fowl was not known in the Western Hemisphere until it was brought here by Europeans. Britain, France, Spain, Holland, and Sweden all sent colonists to America, and from each of these countries came, no doubt, some of the ordinary fowls of that country. Perhaps



FIG. 26. Dominique hen. (Photograph from Skerritt and Son, Utica, New York)



FIG. 27. Silver-Gray Dorking cock

that color, until after the improvement of fowls began. Then some people collected flocks of fowls of this color and bred them for uniformity in other characters. Well-bred fowls, however, were comparatively rare. Most of the stock all through the country was of the little mongrel type until about the middle of the last century. Then that type began to disappear from New England, New

York, New Jersey, and eastern Pennsylvania. It remained longer in the Northern states west of the Allegheny Mountains and a generation ago was still the most common type in the upper Mississippi Valley. It is now unknown outside of the Southern states, and within ten or twenty years it will disappear entirely.

Old European races of fowls. With the exception of the Leghorn, most of the distinct

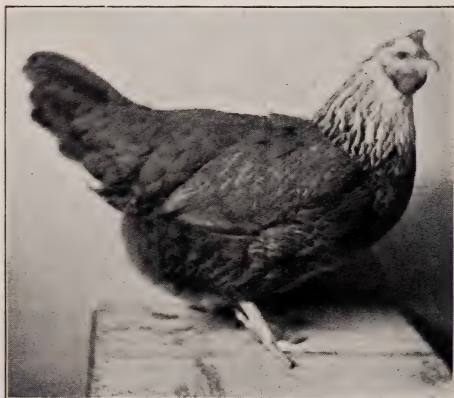


FIG. 28. Silver-Gray Dorking hen

breeds of European origin were brought from England, and the types introduced were not the types as developed in the places



FIG. 29. Single-Comb Brown Leghorn cockerel
(Photograph from Grove Hill Poultry Yards,
Waltham, Massachusetts)

birds that came to this country from seventy to a hundred years ago, or that, if he went to the countries where those races originated, he would find birds just like those he had seen at home. Except in the case of the distinctly English breeds, such as the Dorking and the Cornish Indian Game, which are bred to greater perfection in their native land than elsewhere, he would find most of the European races not so highly developed in the countries where they originated as in England and America, where fanciers are more numerous.

where the breeds (other than English breeds) originated, but those types as modified by English fanciers. In America, again, most of these breeds have been slightly changed to conform to the ideas of American fanciers. So, while the breed characters are still the same as in the original stocks, the pupil looking at birds of these breeds today must not suppose that it was just such

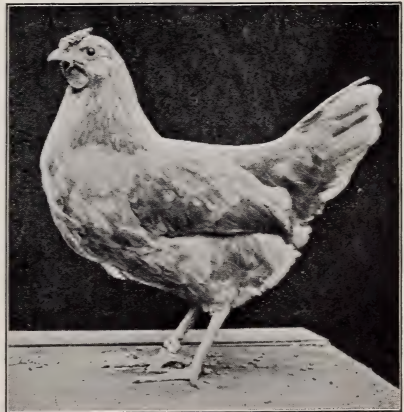


FIG. 30. Rose-Comb Buff Leghorn hen
(Photograph from H. J. Fisk, Falconer,
New York)

Italian fowls. Strictly speaking, the Italian fowls in Italy are not an improved race. The fowl which is known in this country



FIG. 31. Silver-Spangled Hamburg cock¹

as the Leghorn fowl (because the first specimens brought here came from the port of Leghorn) is the common fowl of Italy and has changed very little since it was introduced into that country thousands of years ago. It is found there in all colors, and mostly with a single comb. The Italian type is of particular interest, not only because of its influence in modern times, but because from it were probably

derived most of the other European races. Italian fowls were first brought to this country about 1835, but did not attract popular attention until twenty-five or thirty years later.

English races of fowls. It is supposed that fowls were introduced into Britain from Italy shortly after the Roman conquest. The type was probably very like that of ordinary Leghorn fowls of our own time, but with smaller combs. From such stock the English developed two very different races, the Pit Game and the Dorking. Game fowls

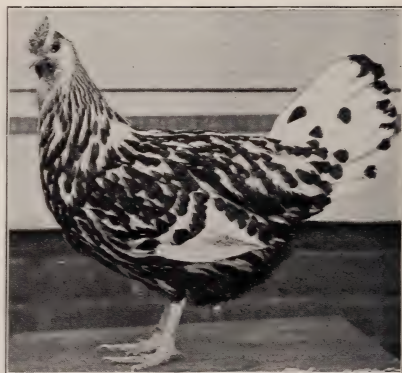


FIG. 32. Silver-Spangled Hamburg hen¹

¹ Photograph from Dr. J. S. Wolfe, Bloomfield, New Jersey.



FIG. 33. White-Crested Black Polish cock¹

endurance, and courage were combined to perfection. The Dorking is the finest type of table fowl that has ever been produced.

German and Dutch races.

The breeds now known as Hamburgs and Polish are of peculiar interest to a student of the evolution of races of fowls, because they present some characters not readily derived from the primitive type of the fowl. The feather markings of some varieties of both these breeds are unlike those of other races, and are markings which would not be likely to become established unless the fowls were bred systematically for that purpose. So, too, with the large crest of the

were bred in all parts of the kingdom, but the Dorkings were a local breed developed by the people in the vicinity of the town of Dorking, where from very early times the growing of poultry for the London market was an important local industry. Each in its way, these two breeds represent the highest skill in breeding. In the Old English Game Fowl, symmetry, strength, en-



FIG. 34. White-Crested Black Polish hen¹

¹ Photograph from Charles L. Seely, Afton, New York.

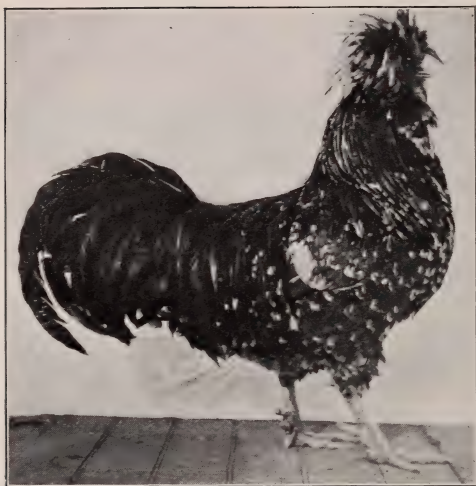


FIG. 35. Houdan cock. (Photograph from the Houdan Yards, Sewickley, Pennsylvania)

Polish fowl : to carry it the structure of the head must be changed. Such changes require systematic breeding for a long period. Dutch and German artists of the sixteenth century painted many farmyard scenes showing fowls of both these types, frequently in flocks with common fowls and with some that appear to be a mixture.

To any one versed in

the breeding of poultry this indicates that these peculiar types had been made by very skillful breeders long before. The most reasonable supposition is that these breeders were monks in the monasteries of Central Europe. Throughout the Middle Ages the monks of Europe, more than any other class of men, worked for improvement in agriculture as well as for the advancement of learning.

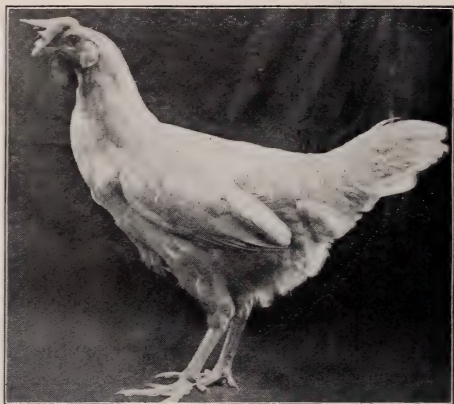


FIG. 36. White Minorca hen. (Photograph from Tioga Poultry Farm, Apalachin, New York)

French races. The Houdan is the only French breed well known in America. It is of the Polish type, but heavier, and

the plumage is mottled irregularly, not distinctly marked as in the party-colored varieties of Polish. The breed takes its name from the town of Houdan, the center of a district in which this is the common type of fowl.

Spanish races. The fowls of Spanish origin well known outside of Spain are the White-faced Black Spanish, the Black Minorca, and the Blue Andalusian. The fowls of Spain at the present time are mostly of the Italian type, with black (or in some districts blue) the predominant color. The Black Spanish seems to have been known in Holland and England for two hundred years or more. In Spain the white face is but moderately developed. The monstrous exaggeration of this character began in Holland and was carried to the extreme by British fanciers who admired it.

The Black Minorca is supposed to have been brought to England direct from Spain about a century ago. There it was bred to much greater size, with the comb often so large that it was a burden to the fowl. Blue Andalusians, at first called Blue Spanish and Blue Minorcas, were first known in England about 1850.

Asiatic races of fowls. The evolution of races of fowls in the Orient gave some general results strikingly different from those in Europe. As far as is known, after the introduction of fowls



FIG. 37. Black Minorca cock. (Photograph from Arthur Trethaway, Wilkes-Barre, Pennsylvania)

FIG. 38. Buff Cochins hen¹

into China and India some thousand years ago the stock which went to those countries and that which descended from it was completely isolated from the fowls of Western Asia, Africa, and Europe until the eighteenth century. When commerce between Europe, India, and the East Indies began, the Europeans found in these countries fowls of a much more rugged type than those

of Europe. Some of these fowls were much larger than any that the visitors had seen. The Aseel of India was a small but very strong, stocky type of Game. Among the Malayans the common fowl was a large, coarse type of Game. The hens of these breeds laid eggs of a reddish-brown color, while hens of all the races of Europe laid white eggs. Birds of both these types were taken to England early in the last century, and perhaps in small numbers before that time.

FIG. 39. Buff Cochins cock¹

¹ Photograph from Tienken and Case, Rochester, Michigan.



FIG. 40. Dark Brahma hen

Chinese races. In China a type of fowl in some ways much like the Malay, in others quite different, had been developed as the common stock of the country. They were about as tall as the Malays, much heavier, and very quiet and docile. They were of various colors, had feathers on the shanks and feet, and laid brown eggs. Some of these fowls were brought to America in sailing vessels very early in the last century and occasionally after

that until the middle of the century, but attracted no attention, for the birds were brought in small numbers for friends of sailors or for persons particularly interested in poultry, and at that time there was no means of communication between fanciers in different localities.

Japanese races. Although the Japanese races of fowls had no particular influence on the development of poultry culture in America, they are of great interest in a study of poultry types, because, when



FIG. 41. Dark Brahma cockerel

intercourse between Japan and Western nations began, it was found that the ordinary fowls of Japan were much like the ordinary fowls of Europe and America, and not, as would be expected, like the fowls of China. This indicated that there had been no exchange of fowls between China and Japan after the type in China became changed. It also affords strong evidence that the fowls of India and China, although so changed,



FIG. 42. Long-Tailed Japanese Phoenix cockerel
(Photograph from Urban Farms, Buffalo, New York)

were originally like the European and Japanese common fowls. The special races developed in Japan were Game Fowls, more like the European than the Malay type; a long-tailed fowl, very much like the Leghorn in other respects; and the very short-legged Japanese Bantam.

The "hen-fever" period. We are all familiar with the

phrase "the hen fever" and with its application to persons intensely interested in poultry, but few know how it originated. The interest in better poultry that had been slowly growing in the Eastern states culminated in 1849 in an exhibition in the Public Garden in Boston, to which fanciers from eastern Massachusetts, Rhode Island, and eastern Connecticut brought their choicest and rarest specimens. This was the first poultry show held in America. Nearly fifteen hundred birds were exhibited, and the exhibitors numbered over two hundred. There were

a few birds of other kinds, but fowls made by far the greater part of the show. All the principal races of Europe and Asia were represented. Most of the exhibitors lived in the immediate vicinity of Boston. About ten thousand people attended this exhibition.

Such an event created a great sensation. Newspaper reports of it reached all parts of the country. The Chinese fowls, so large when compared with others, were most noticed. At once a great demand for these fowls and for their eggs arose, and prices for fancy poultry, which previously had been but little higher than prices for common poultry, rose so high that those who paid such prices for fowls were commonly regarded as monomaniacs. While the interest was not as great in other kinds of fowls as in the Shanghais, Cochin Chinas, and "Brahmaputras," as they were then called, all shared in the boom, and within a few years there was hardly a community in the northeastern part of the United States where there was not some one keeping highly bred fowls. When the interest became general, the famous showman, P. T. Barnum, promoted a show of poultry in the American Museum in New York City. Many celebrated men became interested in fine poultry. Daniel Webster had been one of the exhibitors at the first show in 1849. The noted temperance lecturer, John B. Gough, was a very enthusiastic fancier.

After a few years the excitement began to subside, and most people supposed that it was about to die, never to revive. A Mr. Burnham, who had been one of the most energetic promoters of Asiatic fowls, and had made a small fortune while the boom lasted, had so little confidence in the permanence of the poultry fancy that he published a book called "The History of the Hen Fever," which presented the whole movement as a humbug skillfully engineered by himself. This book was very widely read, and the phrase "the hen fever," applying to enthusiastic amateur poultry keepers, came into common use.

Subsequent developments showed that those who had supposed that the interest in fine poultry was only a passing fad were wrong. The true reason for its decline at that time was that the nation was approaching a crisis in its history and a civil war. When the war was over, the interest in poultry revived at once, and has steadily increased ever since. The prices for fine specimens, which were considered absurd in the days of the

hen fever, are now ordinary prices for stock of high quality.

How the American breeds arose. It is natural to suppose that with such a variety of types of fowls, from so many lands, there was no occasion for Americans to make any new breeds. If, however, you look critically at the foreign breeds, you may notice that not one of them had been developed with reference to the simple requirements of the ordinary farmer and poultry keeper. It was the



FIG. 43. Barred Plymouth Rock cock. (Photograph from Bureau of Animal Industry, United States Department of Agriculture)

increasing demand for eggs and poultry for market that had given the first impulse to the interest in special breeds. The first claim made for each of these was that it was a better layer than the ordinary fowl. In general, these claims were true, but farmers and others who were interested primarily in producing eggs and poultry for the table were rather indifferent to the foreign breeds, because, among them all, there was not one as well adapted to the ordinary American poultry keeper's needs

as the old Dominique or as the occasional flocks of the old native stock that had been bred with some attention to size and to uniformity in other characters.

To every foreign breed these practical poultry keepers found some objection. The Dorking was too delicate, and its five-toed feet made it clumsy. The Hamburgs, too, were delicate, and the most skillful breeding was required to preserve their beautiful color markings. The superfluous feathers on the heads of the crested breeds and on the feet of the Asiatics were equally objectionable. All the European races except the Leghorns had white skin and flesh-colored or slate-colored feet, while in America there was a very decided popular preference for fowls with yellow skin and legs. The Leghorns and the Asiatics met this requirement, but the former were too small and their combs were unnecessarily large, while the latter were larger fowls than were desired for general use, and their foot feathering was a handicap in barnyards and on heavy, wet soils.

So, while fanciers and those who were willing to give their poultry special attention, or who kept fowls for some special purpose which one of the foreign breeds suited, took these breeds up eagerly, farmers and other poultry keepers usually became interested in them only to the extent of using male birds of different breeds to cross with flocks of native and grade hens. In consequence of this promiscuous crossing, the stock in the country rapidly changed, a new type of mongrel replacing the old native stock.

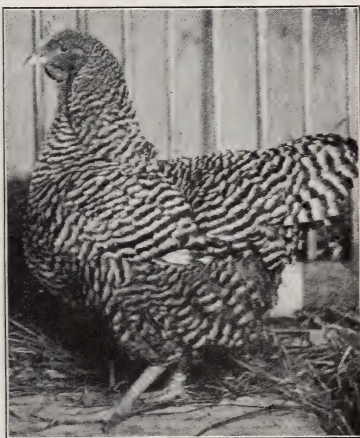


FIG. 44. Barred Plymouth Rock hen
(Photograph from Bureau of Animal
Industry, United States Department
of Agriculture)

While the masses of poultry keepers were thus crossing new and old stock at random, many breeders were trying systematically to produce a new breed that would meet all the popular requirements. Even before the days of the hen fever two local breeds had arisen, probably by accident. These were the Jersey Blue and the Bucks County Fowl, both of which continued down to our own time but never became popular. At the first



FIG. 45. White Plymouth Rock hen
(Photograph from C. E. Hodgkins,
Northampton, Massachusetts)

exhibition in Boston a class had been provided for crossbred fowls, and in this was shown a new variety called the Plymouth Rock. From the descriptions of these birds now in existence it appears that they looked much like the modern Partridge Plymouth Rock. Those who brought them out hoped that they would meet the popular demand, and for a short time it seemed that this hope might be realized, but interest in them soon waned, and in a few years they were almost forgotten.

In the light of the history of American breeds which did afterwards become popular we can see now that the ideas of the masses of American poultry keepers were not as strictly practical as their objections to the various foreign breeds appeared to show. The three varieties that have just been mentioned, and many others arising from time to time, met all the expressed requirements of the practical poultry keeper quite as well as those which subsequently caught his fancy. Indeed, as will be shown farther on, some of the productions of this period, after being neglected for a long time, finally became very popular. Usually this happened when their color became fashionable.

The modern Barred Plymouth Rock. Shortly after our Civil War two poultrymen in Connecticut — one a fancier, the other a farmer — engaged in a joint effort to produce the business type of fowl that would meet the favor of American farmers. A male of the old Dominique type was crossed with some Black Cochin hens. This mating produced some chickens having the color of the sire, but larger and more robust. Another and more skillful fancier saw these chickens and persuaded the farmer to sell him a few of the best. A few years later, when, by careful breeding and selection, he had fixed the type and had specimens enough to supply eggs to other fanciers, he took some of his new breed to a show at Worcester, Massachusetts. Up to this time he had



FIG. 46. Buff Plymouth Rock cock

not thought of a name for them, but as people who saw them would want to know what they were called, a name was now necessary. It occurred to this man that the name "Plymouth Rock," having once been given to a promising American breed, would be appropriate. So the birds were exhibited as Plymouth Rocks.

This new breed caught the popular fancy at once, for it had the color which throughout this country was supposed always to be associated with exceptional vigor and productiveness, and it had greater size than the Dominique. The fame of the new

breed spread rapidly. It was impossible to supply the demand from the original stock, and, as there is usually more than one way of producing a type by crossing, good imitations of the original were soon abundant. Farmers and market poultrymen by thousands took up the Plymouth Rock, while all over the land fanciers were trying to perfect the color which their critical taste found very poor.

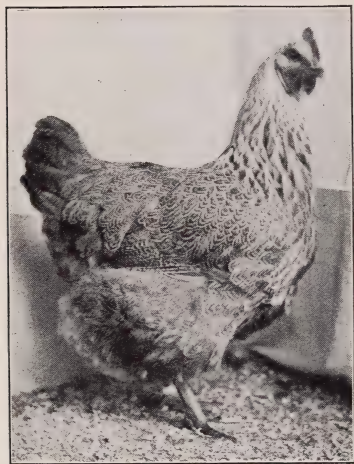


FIG. 47. Silver-Penciled Plymouth Rock hen

Other varieties of the Plymouth Rock. The success of the Plymouth Rock gave fresh impetus to efforts to make new breeds and varieties of the same general character. Great as was its popularity, the new breed did not suit all. Some did not like the color; some objected to the single comb, thinking that a rose comb or a pea comb had advantages; some preferred a shorter, blockier body; others wanted a larger, longer body. The off-colored birds which new races

usually produce in considerable numbers, even when the greater number come quite true, also suggested to some who obtained them new varieties of the Plymouth Rock, while to others it seemed better policy to give them new names and exploit them as new and distinct breeds.

Both black and white specimens came often in the early flocks of Barred Plymouth Rocks. The black ones were developed as a distinct breed, called the Black Java. The white ones, after going for a while under various names, and after strong opposition from those who claimed that the name "Plymouth Rock" belonged exclusively to birds of the color with which the name had become identified, finally secured recognition as White

Plymouth Rocks. Almost immediately Buff Plymouth Rocks appeared. For reasons which will appear later, the origin



FIG. 48. Silver-Laced Wyandotte pullet. Photographed in position showing lacing on back

of these will be given in another connection. Then came in rapid succession the Silver-Penciled, the Partridge, or Golden-Penciled (which, as has been said, is probably quite a close duplicate of the type to which the name "Plymouth Rock" was origi-

nally given), and the Columbian, or Ermine, Plymouth Rock. These were all of the general type of the Barred variety, but because in most cases they were made by different combinations, and because fanciers are much more particular to breed for color than to breed for typical form, the several varieties of the Plymouth Rock are slightly different in form.

The Wyandottes. Closely following the appearance of the Barred Plymouth Rock came the Silver-Laced Wyandotte, called at first simply the Wyandotte. The original type was quite different in color from the modern type. It had on each feather a small white center



FIG. 49. Silver-Laced Wyandotte cockerel

surrounded by a heavy black lacing. This has been gradually changed until now the white center is large and the black edging narrow. At first some of these Wyandottes had rose combs and some had single combs. The rose comb was preferred and the single-combed birds were discarded as culls.

Strange as it seems in the case of an event so recent, no one knows where the first Wyandottes came from. It is supposed that



FIG. 50. White Wyandotte cockerel
(Photograph from W. E. Mack, Woodstock, Vermont)

they were one of the many varieties developed either by chance or in an effort to meet the demand for a general-purpose fowl. They appear to have come into the hands of those who first exploited them in some way that left no trace of their source. They went under several different names until 1883, when the name "Wyandotte" was given them as an appropriate and euphonious name for an American breed.

Next appeared a Golden-Laced Wyandotte, marked like the Silver-Laced variety but having golden bay where that had white. This variety was developed from an earlier

variety of unknown origin, known in Southern Wisconsin and Northern Illinois (about 1870 and earlier) under the name of "Winnebago."

The Silver-Laced Wyandottes, like the Barred Plymouth Rocks, produced some black and some white specimens. From these were made the Black Wyandottes and the White Wyandottes. Then

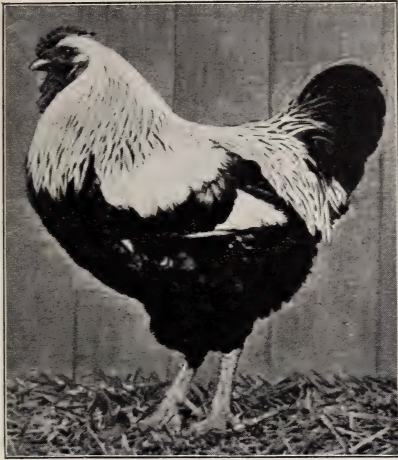


FIG. 51. Siver-Penciled Wyandotte cockerel. (Photograph from James S. Wason, Grand Rapids, Michigan)

came the Buff Wyandottes (from the same original source as the Buff Plymouth Rocks), and after them Partridge Wyandottes, Silver-Penciled Wyandottes, and Columbian, or Ermine, Wyandottes. From the three last-named varieties came the Plymouth Rock varieties of the corresponding colors, the first stocks of these being the single-combed specimens from the flocks of breeders of these varieties of Wyandottes.

The Rhode Island Red. Among the earliest of the local types developed in America was a red fowl which soon became the prevalent type in the egg-farming section of Rhode Island and quite popular in the adjacent part of Massachusetts. Most of the stock of this race was produced by a continuous process of grading and crossing which was systematic only in that it was the common practice to preserve none but the red males after introducing a cross of another color. A few breeders in the district bred their flocks more carefully than others, but the race as a whole was not really thoroughbred until after it became more widely popular.



FIG. 52. Partridge Wyandotte pullet

Although the formation of this race began about 1850 (perhaps earlier), it was fifty years before it became known outside of the limited area in which it was almost the only type to be seen. Indeed, the first birds of this race to attract the attention of the public were exhibited about 1890 as Buff Plymouth Rocks and Buff Wyandottes. At that time very few of the Rhode Island Reds were as dark in color as the average specimen



FIG. 53. Columbian Wyandottes. (Photograph from R. G. Richardson, Lowell, Massachusetts)

now seen in the showroom, and buff specimens were numerous. Birds with rose combs, birds with single combs, birds with pea combs, and birds with intermediate types of comb could often be found in the same flock. So it was not a very difficult matter, among many thousands of birds, to pick out some that would pass for Buff Plymouth Rocks and some that would pass for Buff Wyandottes. These varieties were also made in other ways, mostly by vari-

ous crosses with the Buff Cochin, but for some years breeders continued to draw on the Rhode Island supply.

Some people in the Rhode Island district thought that a breed which could thus furnish the foundation for varieties of two other breeds ought to win popularity on its own merits. So they began to exhibit and advertise Rhode Island Reds. At first they made little progress, but as the breed improved, many more people became interested in it, and soon it was one of the most popular breeds in the country. The modern exhibition Rhode Island Red is of a dark brownish red in color.

The American idea in England ; the Orpington. At the time that the Chinese fowls were attracting wide attention in America and England some were taken to other countries of Europe. In almost every country they had some influence upon the native stock, but as each of the old countries had one or more improved races that suited most of those giving special attention to poultry culture, the influence of the Asiatics was less marked than in our country.

When the Plymouth Rock and the Wyandotte became popular in America, they were taken to England, where, in spite of the preference for white skin and flesh-colored legs, they were soon in such favor that a shrewd English breeder saw the advantage of making another breed of the same general type but with skin and legs of the colors preferred in England. He called his new breed the Orpington, giving it the name of the town in which he lived. The first Orpingtons were black and were made by crossing the black progeny of Plymouth Rocks (which in America had been used to make the Black Java), Black Minorcas, and Black Langshans. Then the originator of the Orpingtons put out a buff variety, which he claimed was made by another particular combination of crosses, but which others said was only an improvement of a local breed known as the Lincolnshire Buff. Later White Orpingtons and Spangled Orpingtons appeared.

Present distribution of improved races. Having briefly traced the distribution of the fowl in ancient times, and the movements which in modern times brought long-separated branches of the species together, let us look at the present situation.

The Plymouth Rocks, Wyandottes, Rhode Island Reds, and Orpingtons, which are essentially one type, the differences between them being superficial, constitute the greater part of the improved fowls of America and England and are favorites with progressive poultry keepers in many other lands. In many parts of this country one rarely sees a fowl that is not of this type,

either of one of the breeds named or a grade of the same type. After the general-purpose type, the laying type, which includes the Italian, Spanish, German, and Dutch races, is the most popular, but in this type popularity is limited in most places to the Leghorns and to a few breeds which, though classed as distinct breeds, are essentially the same. The Ancona is really a Leghorn, and the Andalusian, although it comes from Spain,



FIG. 54. Single-Combed Buff Orpington cock
(Photograph from Miss Henrietta E. Hooker,
South Hadley, Massachusetts)

is, like other races in that land, distinctly of the same type as the fowls of Italy.

With the growth of a general-purpose class, interest in the Asiatic fowls rapidly declined. They are now kept principally by fanciers and by market poultry growers who produce extra large fowls for the table.

Deformed and dwarf races. Although some of the races of fowls that have been considered have odd characters which, when greatly ex-

aggerated, are detrimental and bring the race to decay, such characters as large combs, crests, feathered legs, and the peculiar development of the face in the Black Spanish fowl, when moderately developed, do not seriously affect the usefulness of fowls possessing them. With a little extra care they usually do as well as fowls of corresponding plain types. Poultry keepers who admire such decorations and keep only a few birds do not find the extra care that they require burdensome, and

consequently all these races have become well established and at times popular. It is notable that in all fowls of this class the odd character is added to the others or is an exaggeration of a regular character. There are two other classes of odd types of fowls. The first of these is made up of a small group of varieties defective in one character; the second comprises the dwarf varieties, most of which are miniatures of larger varieties.

Silky fowls. In all races of fowls individuals sometimes appear in which the web of the feathers is of a peculiar formation, resembling hair. Such fowls are called silkies. They are occasionally exhibited as curiosities but are not often bred to reproduce this character. There is one distinct race of white fowls, so small that it is usually classed as a bantam, having feathers of this kind.

Frizzled fowls. The feathers of a fowl are sometimes curled at the tips, like the short curls in the feathers which indicate the sex of a drake. Such birds are called frizzles or frizzled fowls. True frizzles, like true silkies from races having normal plumage, are very rare. Many of the fowls exhibited at poultry shows as Frizzles are ordinary birds the feathers of which have been curled artificially.

Rumpless fowls. The tail feathers of a fowl are borne on a fleshy protuberance at the lower end of the spine. It sometimes happens that one or more of the lower vertebræ are missing. In that case the fowl has no tail and the feathers on the back, which in a normal fowl divide and hang down at each



FIG. 55. Single-Combed White Orpington hen. (Photograph from Bureau of Animal Industry, United States Department of Agriculture)

side, fall smoothly all around. True rumpless fowls are rare. Many of the specimens exhibited are birds from which the rump was removed when they were very young.

Bantams. Dwarf, or bantam, fowls, on account of their diminutive size and pert ways, are especially attractive to children. Breeding them to secure the minimum size, the desired type, and fine quality in plumage color has the same fascination for a fancier as the breeding of large fowls, and as the small birds are better adapted to small spaces, fanciers who have little room



FIG. 56. White Cochín Bantam cockerel

often devote themselves to the breeding of bantams. The larger and hardier varieties of bantams are good for eggs and poultry for home use, but are not often kept primarily for these products. Most people who keep bantams keep only a few for pleasure, and the eggs and poultry they furnish are but a small part of what the family consumes.

Bantam keepers who have a surplus of such products can usually find customers in their own neighborhood. The very small bantams and the very rare varieties are usually delicate and so hard to rear that amateurs who try them soon become discouraged and either give up bantams or take one of the hardy kinds. It is better to begin with one of the popular varieties, which are as interesting as any and, on the whole, are the most satisfactory.

Origin of bantams. After the explanation of the origin of varieties given in Chapter III, and the description of the evolution of the different races of fowls in the present chapter, it

is perhaps not really necessary to tell how dwarf races of fowls originated; but the belief that such races were unknown until brought to Europe from the city of Bantam, in the Island of Java, is so widespread that it can do no harm to give the facts which disprove this and in doing so to show again how easily artificial varieties are made by skillful poultry fanciers.



FIG. 57. Bantams make good pets

As has been stated, people who do not understand the close relations of the different races of fowls, and do not know how quickly new types may be established by careful breeding, attach a great deal of importance to purity of breed. Hence, unscrupulous promoters of new breeds have often claimed that they received their original stock direct from some remote place or from some one who had long bred it pure. The idea of assigning the



FIG. 58. Black-Tailed White Japanese Bantams
(Photograph from Frederick W. Otte, Peekskill, New York)

for dwarf varieties of European races, but it was published by some of the early writers, used by lexicographers, and, having found a place in the dictionaries, was accepted as authoritative by the majority of later writers on poultry, even after some of the highest authorities had shown conclusively that this view of the origin of dwarf races was erroneous.



FIG. 60. White Polish
Bantam cock

No evidence of the existence of a dwarf race of fowls in Java has ever been produced. The Chinese and Japanese bantams did not come to Europe and America until long after the name "bantam" came into use. Dwarfs occur and undoubtedly have occurred frequently in every race of fowls. Usually they are

town of Bantam as the home of a true species of dwarf domestic fowl seems to have occurred to some one in England more than a hundred years ago, and to have been suggested because of the resemblance of the name of this Asiatic city to the English word "banty," the popular name for a dwarf fowl. It seems strange that such a fiction should be accepted as accounting

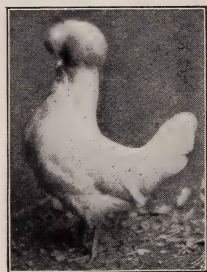


FIG. 59. White Polish
Bantam hen

unsymmetrical and weakly, and are called runts and put out of the way as soon as possible. But occasionally an undersized individual is finely formed, active, and hardy. By mating such a specimen with the smallest specimen of the other sex that can be found (even though the latter is



FIG. 61. Black Cochin Bantam pullet¹

much larger), and by repeated selection of the smallest specimens, a dwarf race may be obtained. It could be made, though not so rapidly, by systematic selection of the smallest ordinary



FIG. 62. Black Cochin Bantam cockerel¹

specimens and by keeping the growing chicks so short of food that they would be stunted. The latter process, however, is so tedious that no one is likely to adopt it. Usually the idea of making a new variety of bantams does not occur to a breeder



FIG. 63. Rose-Comb Black Bantam cock

until he sees a good dwarf specimen of a race of which there is no dwarf variety. Then, if he undertakes to make such a variety, he is likely to use in the process both small speci-



FIG. 64. Rose-Comb Black Bantam hen²

mens of large races and birds of long-established dwarf races.

Dwarf types of most of the popular breeds have been made here and exhibited, but the originators were given very little encouragement to perfect them.

¹ Photograph from Dr. J. N. MacRae, Galt, Ontario.

² Photograph from Grove Hill Poultry Yards, Waltham, Massachusetts.

Varieties of bantams. The most popular bantams in this country to-day are the Cochin Bantams, formerly called Pekin Bantams because the first that were seen in Europe and America had come from Peking. Only the self-colored varieties—buff, black, and white—are natives of China. The Partridge variety was made in

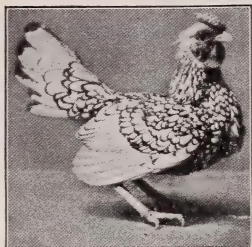


FIG. 65. Silver Sebright Bantam cockerel



FIG. 66. Silver Sebright Bantam pullet

England, where there are several other color varieties not known in this country. The Common Game Bantam is a dwarf Pit



FIG. 67. Dark Brahma Bantam cockerel

Game fowl; the Exhibition Game Bantam is a dwarf type resembling the Exhibition Game, developed from the Common Game Bantam. Rose-Comb Black and Rose-Comb White Bantams are diminutive Hamburg fowls; Polish Bantams are diminutive Polish. The Sebright Bantams are of the same general type as the Rose-

Combs, but in color they are laced like the large varieties of Polish, not spangled like the party-colored Hamburgs. They are further distinguished by being "hen-tailed," that is, the males having tails like hens. Sebright Bantams were made in



FIG. 68. Light Brahma Bantam hen with brood¹

¹ Photograph from Brook View Farm, Newbury, Massachusetts.

England about a hundred years ago, by Sir John Sebright, for whom they were named. Although the large Brahmas and Cochins are originally of the same stock, no bantams of the colors of the Brahmas have come from China. The Light and Dark Brahma Bantams were made in England and America in very recent times. From Japan has come a peculiar type of bantam with very short legs, a large tail carried very high, and a large single comb. In their native country the Japanese Bantams are not separated into distinct color varieties. In England and America there are black, white, gray, black-tailed white, and buff varieties.

CHAPTER V

MANAGEMENT OF FOWLS

The methods of managing fowls vary according to the conditions under which they are kept and the time that the keeper can give them. Fowls ought to have an outdoor run, and it is desirable that this should be large enough to be kept in sod; but very few people in towns can give their fowls grass yards, and the advantages of an outdoor run will not in themselves compensate for neglect in other matters. Hence we often see fowls under poor conditions, with good care, doing better than fowls, in a much more favorable environment, that are given indifferent care. No absolute rules for keeping fowls under any given conditions can be made. In general, small flocks of fowls that have free range or large, grassy yards need very little attention, while those that are closely confined require a great deal.

With good care the egg production of fowls in close confinement is often better than that from fowls at liberty, but if the cost of caring for the fowls is computed at current rates for common labor, the rate of compensation is often higher on fowls running at large than on fowls in confinement which are producing many more eggs. The question of profits from amateur poultry keeping, however, should not be considered solely with reference to the compensation for time used, nor should such work be adjusted wholly with reference to economic results, for it combines recreation, education, and money compensation, and the first two results should have as much consideration as the last.

In this chapter the methods adapted to small flocks are first described for the instruction of the pupil, and then descriptions of operations on a larger scale are given for his information.

SMALL FLOCKS ON TOWN LOTS

Numbers in flocks. The average number of fowls kept by a town family for its own use is about one dozen. Very few who keep hens have less than half a dozen, and not many who plan only to supply their own tables have more than a dozen and a half. Six fowls, if well cared for, will produce all the eggs used by an average family of two or three persons during the greater part of the year.

Houses and yards. For a dozen medium-sized fowls the house should be about 8 ft. $\times$ 8 ft. on the ground, with the highest point of the roof about 6 or 7 feet from the floor. The general rule is to make the poultry house face the sun, and have the windows and the outside doors in or near the front. The object of this is to get as much sunlight in the house as possible

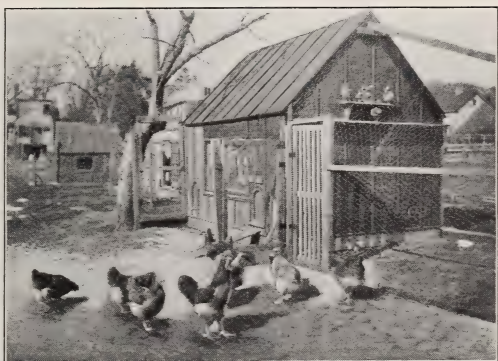


FIG. 69. Small house used for fowls and pigeons

in winter, when the sun is low, and to have the walls tight that are exposed to the prevailing cold winds. In the Northern Hemisphere the front of the house is toward the south; in the Southern Hemisphere it is toward the north. In tropical and subtropical countries houses are often so constructed that they can be kept open on all sides in summer and closed tightly, except in front, during cool weather.

If the land on which a house stands is sandy and well drained, the floor may be of earth. The common practice where earth floors are used is to fill the earth level with the top of the sill

and renew it once a year by removing the soil that has become mixed with droppings of the fowls and putting in fresh earth. When a house stands on wet land or on clay soil, it is better to have a floor of boards or of cement.

Fowls may be confined to a house for a year or more and lay well and be in apparently good condition at the end of such a period, but as the chickens hatched from the eggs of fowls that have been so closely confined for even a few months are almost



FIG. 70. An old-style small poultry house and yard

invariably less vigorous than those produced from fowls that live a more natural life, this plan is not much used except by those who keep a few fowls for their eggs only and renew the stock by purchase as often as necessary.

To give a flock of a dozen fowls outdoor air and exercise enough to keep them in good condition, a yard containing about 300 sq. ft. is necessary. There is no perceptible advantage in giving more yard room than this, unless the yard can be made so large that grass will grow continuously in the greater part

of it. On most soils this would require a yard containing from 750 to 1000 sq. ft. in sod before being used for poultry.

When fowls are confined to their houses, or to the houses and small yards, the droppings must be removed at frequent, regular intervals. To facilitate this it is customary to have a wide board, called the droppings board, under the roost at a distance of eight or ten inches. All the droppings made while the birds are on the roost fall on this board and are easily collected and removed.

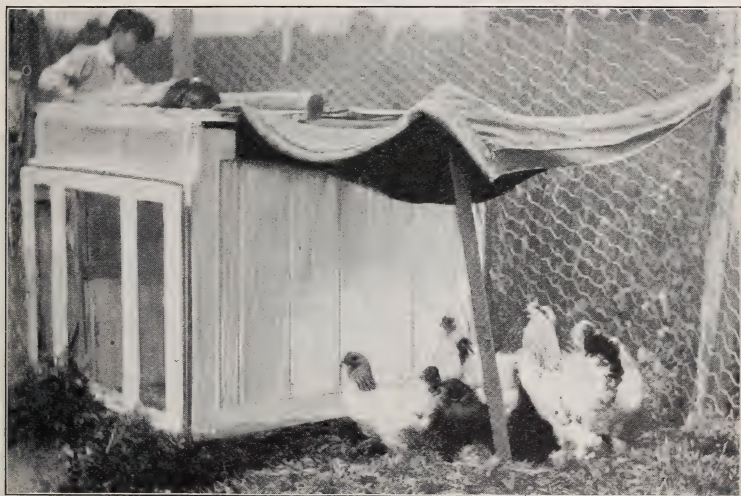


FIG. 71. Coop and shade for flock of Bantams¹

It is a good plan to keep a supply of dry earth in a convenient place, and strew a little of this over the droppings board after each cleaning. Sifted coal ashes, land plaster, and dry sawdust are sometimes used instead of earth on the droppings boards. The droppings of fowls, when not mixed with other matter, are often salable for use in tanning leather, but in most cases the difference in their value for this purpose and for use as

¹ The coop is an old dry-goods box; the shade is a burlap bag. Makeshift arrangements are not always nice looking, but some of the finest chickens are kept in very poor quarters.

plant fertilizer is not great enough to pay for the extra trouble which is made by saving them for the tanners. Poultry manure

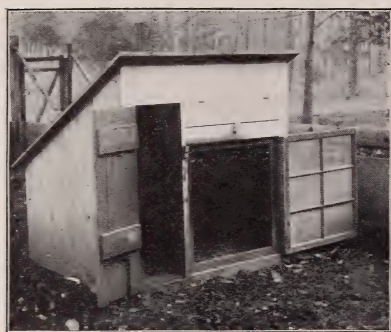


FIG. 72. Neat house for six hens

is one of the most valuable fertilizers and can always be used to good advantage on lawns and gardens.

If the floor is of wood or of cement, a thin layer of earth or sand spread upon it makes it more comfortable for the fowls. On all kinds of floors the modern practice is to use a few inches of litter of some kind. There is a great variety of materials that will serve this purpose. Lawn clippings raked up after they are dry, dried weeds and grass from the garden, leaves collected when dry and stored to be used as wanted, straw, hay, cornstalks cut into short lengths, and shavings, such as are sold baled for bedding horses and cattle, are all good. Fresh litter should be added in small quantities about once a week. About once a month the coarse litter on top should be raked aside, and the fine litter mixed with droppings underneath removed. Once or twice a year all the material should be taken out and a fresh start made.



FIG. 73. House for a dozen fowls. Floor, 8 ft. $\times$ 8 ft.; height at sides, 4 ft.; height in middle, 7 ft.

When kept in a house having an earth floor, fowls will scratch aside the litter from small spaces and wallow and dust themselves. In houses having hard floors, shallow boxes about 2 ft. square,

containing several inches of dry earth, are placed for the birds' dust baths. Fresh earth must be provided frequently or they will not use the bath as freely as is desirable. For use in winter the earth must be so dry that it will not freeze, but the birds prefer earth that is slightly moist. The first function of the dust bath is to clean the feathers, and damp earth does this much better than earth that is very dry. In wallowing to clean their plumage fowls also rid themselves of lice. When it is not convenient to store much earth, the same material may do double service — first in the dust bath, then on the droppings board.

In a bare yard the soil should be turned over often, all the matter that can be raked up with a fine rake hav-

ing first been removed. A yard that is in grass requires little care except near the house, where the ground may be bare. Here it should be forked over occasionally.

Feeding. The feeding of a small flock of fowls is a very simple process. The table and kitchen waste of an ordinary family will furnish all the soft food that they need, and usually enough green food to prevent their suffering for lack of such foods if no other provision is made for supplying them. This waste should not be carried from the house as it is made, and thrown on the ground for the fowls to pick out of the dirt. A better way is to provide a covered jar large enough to hold the accumulation of this material for a day. Into this may be put all the leavings from the table, except such things as orange and

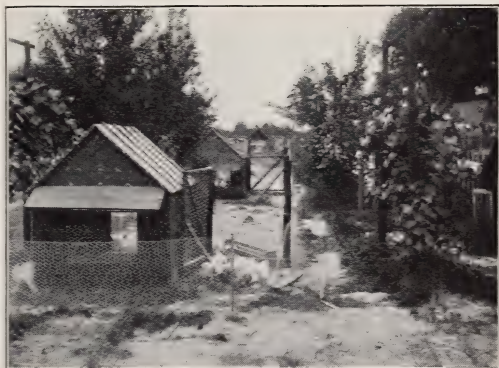


FIG. 74. Small houses in back yard

banana peelings, large bones, and pieces of fat meat. Once a day, at whatever time is most convenient, the contents of the jar should be mixed with as much corn meal and bran (equal parts by measure) as will take up the water in them and make a moist but not sloppy mash. This should be fed in a clean trough. If the trough stands high enough from the floor to keep the contents clean, it will do no harm if more food is given than the birds will eat up at once, but the quantity given should never be so great that it will not be eaten before the next feeding time.

Most people find the morning the most convenient time to give the mash. If the mash is fed in the morning, a small feed of hard grain should be given about noon, and a more liberal one an hour or two before sunset. Some poultry keepers feed the different grains separately; others mix them before feeding. Advocates of different practices often imagine advantages for that which they favor, but no advantage can be demonstrated for either. Wheat and cracked corn are the grains most used in this country; they are about equal in feeding value. As corn is nearly always cheaper than wheat, the usual practice is to feed about twice as much corn. When the grains are mixed, one part (by measure) of wheat is used to two parts of cracked corn. When they are fed separately, it is usual to feed the wheat at noon, as the light feed, and the corn in the evening, as the heavy feed. All the common grains except rye make good poultry foods. Why fowls do not like rye is one of the puzzles of poultry keeping. In some countries it is used for poultry to a greater extent than in the United States, and fowls forced to eat it here have done very well for short periods, but will not eat it readily if they are accustomed to other grains and can get enough to sustain life without it. Fowls do not like dry oats so well as corn and wheat, but have not such a dislike for them as for rye. They are very fond of oats soaked in water and partly sprouted.



FIG. 75. With curtains closed

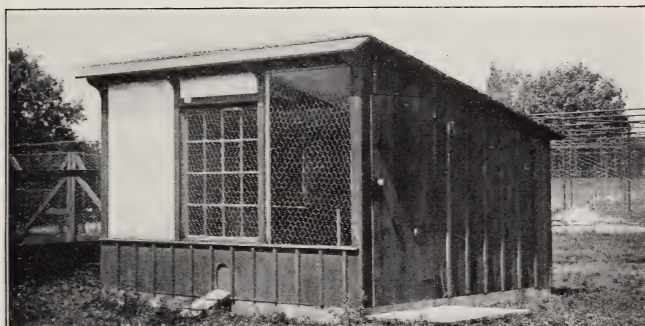


FIG. 76. With one curtain open

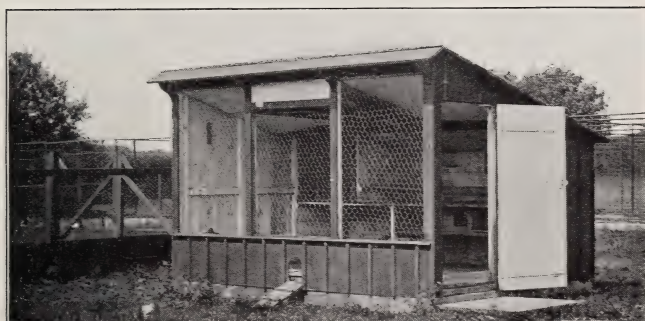


FIG. 77. As an open-front house

POULTRY HOUSE USED AT THE CENTRAL EXPERIMENT STATION,
OTTAWA, CANADA
(Photograph from the station)

The quantity of grain to be given any flock of fowls must be determined by trial and observation. The grain should not be fed in troughs from which the birds can eat it very quickly, but scattered in the litter on the floor, so that the fowls will take exercise scratching it out, and eat slowly. There is an advantage in giving some soft and quickly digested food, but if too much of the food can be eaten quickly, the birds do not take exercise enough. When there is grass in the poultry yard, it is a good plan to scatter the grain in the grass sometimes



FIG. 78. Flock of Barred Plymouth Rocks

in fine weather. The hens will find it all, and in scratching it out will bring up the dead grass, and a better sod will grow afterward.

A dozen medium-sized fowls, if fed in the morning with the mash described above, would probably need a little over a pint of grain in the middle of the day and about a quart toward evening. An experienced feeder can usually tell by the eagerness of the fowls for their food whether to increase or diminish the quantity; but the most expert poultry keeper does not rely upon this kind of observation alone. Occasionally, before giving food, he looks in the litter to see if there is grain left

there from previous feedings, and if he finds much, gives no more until the birds have eaten this all up clean.

Water should be given as often as is necessary to keep the supply quite fresh. In cool (but not freezing) weather, once a day is usually sufficient. In hot weather the water should be fresh two or three times a day, in order that the birds may have cool drinks. In freezing weather many poultry keepers give the water warm, because then it does not freeze so quickly. The advantage of this is very slight, and wattles that



FIG. 79. Flock of Single-Comb White Leghorns

are wet with warm water in extreme cold weather become especially susceptible to frost. It is not really necessary to give fowls water when they can get snow or ice in a form in which they can eat it.

Hens that are laying must be well supplied with oyster shells or lime in some form for the shells of the eggs. They can get a part of the lime required for this purpose from the lime in foodstuffs, but not nearly enough to make good thick shells for all their eggs when they are laying well. Ground oyster shells are sold by all dealers in poultry supplies.

Growing chickens. Where old fowls have to be kept in close confinement, very little can be done in growing chickens. Some amateur poultry keepers raise in small, bare yards birds that are as good as the average chickens grown under more favorable conditions, but where one succeeds in doing this a hundred fail. Most of the chickens grown in close quarters are very



FIG. 80. White Wyandotte hen and chicks

poor indeed in comparison with farm-grown chickens, and quite unfit to be kept for laying or breeding purposes. Those who succeed in growing good chickens in a small place usually give a great deal more time to the work than the chickens produced are worth. The best way for a poultry keeper so situated to get as much as possible of the pleasure of this interesting line of work is to hatch a few broods and, when the chicks are large enough, broil, eat, or sell all but a few of the best pullets

and one or two cockerels. If these thrive, they may be worth keeping for a year ; but if, as they mature, they do not seem rugged, it is not wise to use them for laying stock.

Where there is room to give young chickens a good grass yard, a limited number can be grown to maturity year after year on a town lot and used for laying and breeding purposes. Many town poultry keepers who might grow a few very good chickens never grow a good one because they always try to raise too many for the space at their disposal. Fifty or a hundred chickens may be kept until two months old on a plot of land only large enough to carry twelve or fifteen to maturity. So people start out with a great many more chickens than they ought to have on their land, never thinking that the better their chickens do at the start the sooner they will begin to overcrowd their quarters, and that when that stage is reached, the promising results of several months' work may in a few days be ruined beyond remedy. After they are two or three months old, young chickens will not make the best growth of which they are capable unless they have either a great deal of room or a great deal more care than most people who raise only a few, and have other work to do, can afford to give them.

SMALL FLOCKS ON ORDINARY FARMS

Numbers in flocks. The ordinary farm flock consists of from fifty to one hundred adult fowls and, during the growing season, from one hundred to two hundred chickens. The old stock is usually kept in one or more small houses located among the other outbuildings, and all run together during the day. If the farmer wants to keep the fowls out of the dooryard and the kitchen garden, he does not make yards for the fowls, but incloses the dooryard and garden. Outside of these the birds go where they please. The coops for the young chickens are often kept in the dooryard or the garden until the chickens

are weaned, but after that the young birds are nearly always turned out to take their chances with the old ones.

Under such conditions a farm flock is not often very productive, yet, as the birds secure a large part of their food by foraging, the flock may be more profitable than a more productive flock for which all food is bought and upon which a great deal of labor is expended. While this way of keeping fowls on farms is not in itself commendable, it is not to be altogether



FIG. 81. A small farm stock of fowls, ducks, and turkeys

condemned, because circumstances often compel the farmer to treat his fowls as a sort of volunteer or self-producing crop. The conditions on a farm admit of this, and as a matter of fact the greater part of our enormous total production of eggs and poultry comes from the half-neglected flocks on the ordinary farms. Hence the conditions are tolerable where they are necessary, but whenever it is possible to give farm fowls enough attention to obviate the faults of common practice, the product and the profits can be greatly increased with very little increase in the

cost of production. In this section we consider the best methods of securing this result when all the old stock is to be kept as one flock. Old stock and young ought always to be separated unless the old birds constitute an insignificant portion of the flock.

Single houses for farm flocks. It is as true on a farm as elsewhere that the greatest yields of eggs and the best growth in young birds are secured when the flock is divided into small groups. But a farm flock of the class under consideration, while it makes its headquarters in such buildings as may be



FIG. 82. Good poultry house on Texas farm. (Photograph from Bureau of Animal Industry, United States Department of Agriculture)

provided, will forage a considerable distance in every direction, going among growing crops from which the larger farm animals must be excluded, and also following the larger animals in their stables, yards, and pastures and picking up food left by them. As fowls also eat many weeds and seeds of weeds, and all kinds of destructive insects, the advantages of letting them run at large more than make up for lower production. Also the production is normal and can be easily maintained from year to year in the same line of stock, while high production secured by extra care is forced and can be maintained

in the same line of stock for only a few generations. A flock of one hundred fowls or less, that run together, may all be kept in one house just as well as in several, if the size of the house and the equipment are in proportion to the size of the flock.

If the snow lies long on the ground, so that the fowls are confined to the house much of the time in winter, the allowance of floor space should be about 5 sq. ft. per bird. Where



FIG. 83. Rude poultry house on a Kansas farm. (Photograph from Bureau of Animal Industry, United States Department of Agriculture)

the snow rarely lies more than a day or two at a time, less space may be given, because the birds will not occupy the house much of the time during the day. Under such conditions the allowance of floor space may be as low as 3 sq. ft. per bird. Those who go to this limit, however, should consider that, in the unusual case of a snowstorm keeping the hens confined to the house for more than a very few days, overcrowding may cause losses that more than offset what was gained by using the highest capacity of the house.

Usually a flock of fifty hens needs a house with a floor surface of about 250 sq. ft. This is obtained in a house 16 ft. square or in a house 12 ft. $\times$ 24 ft. A house 20 ft. square is about right for seventy-five or eighty hens, and is not badly overcrowded if one hundred medium-sized birds are put into it. If an oblong building is preferred, a house 12 ft. wide by 42 ft. long gives one hundred birds 5 sq. ft. of floor space per bird. Houses of



FIG. 84. Good poultry house on a Kansas farm. (Photograph from Bureau of Animal Industry, United States Department of Agriculture)

such size should be from 4 ft. to 7 ft. high at the sides, and from 7 ft. to 10 ft. high at the highest point of the roof, according to the style of construction.

Feeding. In the feeding of a farm flock the first thing to consider is what the birds can pick up by foraging. The poultry keeper on a farm, even more than the poultry keeper elsewhere, should make it a rule to do nothing for poultry that they can do for themselves. Fowls can do more for themselves

at some seasons than at others, because natural food is more abundant. As fowls do not usually go very far from their house, the larger the flock the less food each bird will secure. On some farms quite a large flock of fowls can get all the food they need about the barns and stockyards and in orchards and fields near the homestead.

When the conditions are such that it may reasonably be supposed that the fowls can get all the food they require without

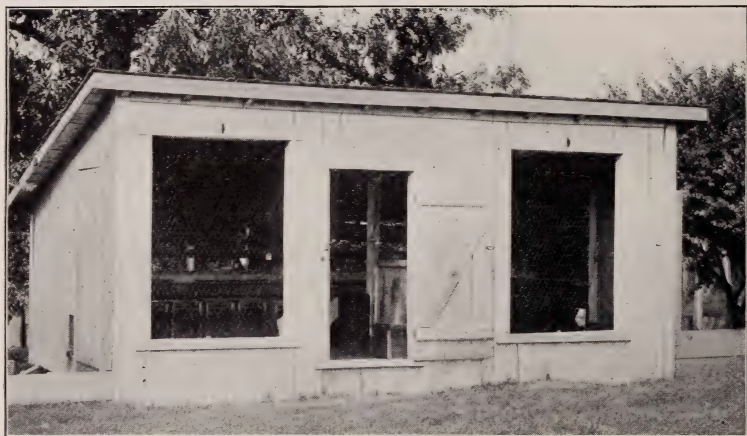


FIG. 85. Poultry house at Mississippi Agricultural College.¹ (Photograph from the college)

going farther than fowls usually wander, the best way to determine whether this supposition is correct is to give them no food until evening, then throw out a little grain and see how much they will eat. If it appears that they need to be fed a considerable quantity, it is better to give a light feed in the morning and another in the evening than to give a heavy feed once a day, because if they learn to expect a full feed at a regular time, they will not forage so well. Fowls that have an opportunity to secure considerable food by foraging should never be fed so much in

¹ In this house the part of the rear wall above the roost platform is made to open wide, thus affording perfect ventilation in summer.

the morning that they will sit around for hours. When hens on a farm need only one or two light feeds a day, whatever grain is most convenient may be given them. Where they get so much exercise and a good variety of other foods, whole corn is as good as anything. A good way to feed it is to break the ears into short pieces and let the birds pick the grain from the cob.

In winter the feeding of the farm flock should have more attention, especially if little food can be secured around the stables and stockyards. It is a good plan to give, once a day, a warm mash made of 1 part (by measure) of corn meal and 2 parts of bran, and to give as much grain at one other feeding as the hens will eat. Some farmers use sheaf oats for litter in the floors of their poultry houses, throwing in a sheaf or two as often as is necessary to keep a good depth of litter on the floor, and then give as much corn in addition as the hens will eat readily.



FIG. 86. Open-front house with hood
(Photograph from Department of Agriculture, Victoria, British Columbia)

If it is not convenient to make a mash, what grain the fowls will eat quickly from a trough may be prepared for a warm breakfast for them by pouring boiling water on it in the evening and letting it soak overnight. Any of the small grains and cracked corn may be fed in this way; whole corn needs longer soaking. In hard, freezing weather no more mash or soaked grain should be given than the fowls will eat before it can freeze. A favorite old-time practice still used on many farms is to heat shelled corn in the oven and feed it while warm.

The best vegetable foods for fowls in winter are cabbages and mangel-würzels. The cabbages can be hung up by the roots and the fowls will eat all but the stump. The most convenient way

to feed the beets is to split them and impale the pieces on spikes in the wall at a convenient distance from the floor. Sound, sweet turnips are also good, but bitter turnips and those that have begun to spoil are likely to give an unpleasant flavor to the eggs. A little freezing does not seem to affect the value of these vegetables for poultry food, and the birds will usually eat them when frozen. The quantity fed at one time, however,



FIG. 87. Movable poultry house on United States Government farm, Beltsville, Maryland. (Photograph from Bureau of Animal Industry)

should not be so large that it may freeze and thaw several times before it is all eaten.

When hogs and cattle are killed on a farm, the blood and other offal, and the small trimmings when the carcasses are cut up, should be saved and fed to the fowls regularly in moderate quantities, but care should be taken not to leave fat trimmings where the fowls can help themselves, for if fowls have been short of animal food, they eat meat very greedily



FIG. 88. The upper shutter is closed only at night in extreme cold weather



FIG. 89. Lower part of front open for hot weather

ANOTHER STYLE OF MOVABLE HOUSE AT THE UNITED STATES
GOVERNMENT FARM, BELTSVILLE, MARYLAND
(Photograph from Bureau of Animal Industry)

and are often made sick by it. Blood and lean meat are not very injurious, but too much fat meat has very bad effects.

It is not necessary to give the fowls water when there is snow on the ground. Delicate fowls that are accustomed to close confinement may not be able to stand running out on the snow, but if they have a comfortable house, with a good supply of litter on the floor, and are free to go and come at will, rugged birds that are out in all kinds of weather are not in the least

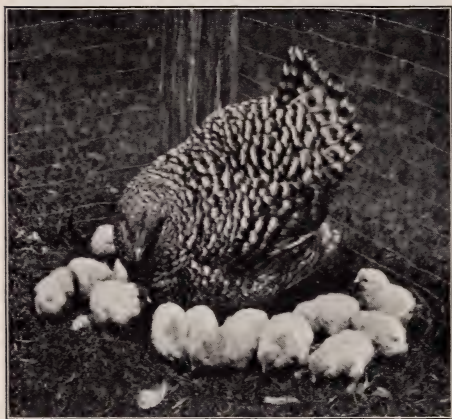


FIG. 90. Barred Plymouth Rock hen with
Light Brahma chicks

hurt by going out on snow and ice and wet ground in cold weather, and will usually take snow in preference to water when they can get it. When the ground is bare and frozen, water or finely chipped ice should be supplied. In extreme cold weather the latter is better, because the water soon freezes and the fowls go thirsty until a fresh supply is given them.

Reproducing the flock. Fowls are short-lived creatures. They mature in less than a year; their period of greatest productiveness is usually over before they are two years old, and only a very small proportion of a flock are worth keeping after that. Hence the entire stock of fowls on a farm is renewed in two years. Most farmers intend to kill off all their two-year-old hens each year, thus keeping up the number in the flock by growing annually about as many young birds as there are hens in the flock. To allow for losses, for an excess of males, and for inferior pullets which are not worth keeping for layers, it is necessary to hatch about four times as many chickens as are to be reserved.

The hatching season. Most of the chickens reared on farms are hatched in the spring months. The late-hatched chickens are nearly all from hens that steal their nests. People on farms do not want late chickens; among so many larger ones a few small birds have very little chance to make good growth. But those who have a place to keep a few early chickens and time to take care of them often set a few hens in the winter. Eggs will hatch at any season of the year, and chickens will grow if they get proper care; but there is a comparatively short season in the spring when eggs hatch better and chickens grow better than at any other time, and the easiest way to get a given number of good chickens that will be full-grown at the beginning of winter is to hatch them in this natural hatching season. This season cannot be exactly defined, because it varies according to latitude and also from year to year according to the weather. Perhaps the best general rule is to have the first chicks hatch when the grass is beginning to grow. To effect this the hens must be set three weeks earlier, when there may be no signs of spring. No one can time hatches to a natural phenomenon of this kind with certainty, but by planning with reference to the advance of spring in a normal season, the first hatches are usually brought very near to the desired time.

Broody hens. When a hen wants to incubate eggs, or, as the common phrase is, to sit, she remains on her nest continuously and, unless very shy, will not leave it when approached and will resent any interference. The hen is then said to be broody. Because the broody hen makes a clucking noise, she is sometimes called a clucking hen. Hens that are shy when they begin to cluck, and that fly from the nest when approached, usually become tame and allow themselves to be handled after a few days. Broody hens cannot always be obtained at the time they are wanted. In that case there is nothing to do but wait, or try to buy, hire, or borrow them. There is no way of forcing or inducing hens to become broody before they would do so of

their own accord. When broody hens are hard to get, people think that hatching with incubators will relieve them of trouble and prevent delay, but the incubator, too, has its uncertainties. Success in artificial hatching requires careful attention to the

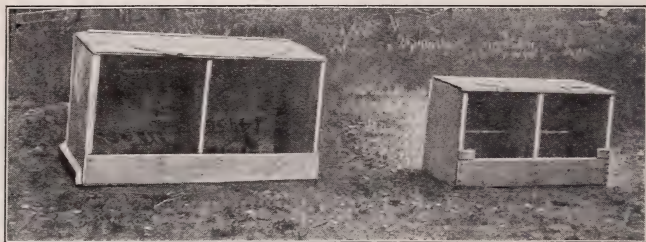


FIG. 91. Nest boxes, made in pairs, for sitting hens. Inside dimensions: large, 16" $\times$ 16" $\times$ 18"; small, 12" $\times$ 12" $\times$ 15"

operation of the incubator and good judgment in adjusting and regulating it.

Setting the hens. As many broody hens as can be obtained should be set at the same time. The most convenient style of nest is that shown in Figs. 91 and 92, which can be kept closed if desired. The best nest material is soft hay or straw. In preparing the nest a poultry keeper shapes the nest material with his



FIG. 92. Same as Fig. 91, with nest boxes closed

hand, to give it a bowl shape, pressing it down to make a smooth, firm surface upon which the eggs will lie evenly. It is a good plan to make the nests and place the hens in them, giving to each a few China nest eggs two or three days before the eggs that are to be hatched are given to them. The eggs for hatching

should be of good size and shape, with good strong shells, and as uniform in color as can be obtained. The usual number of eggs placed under a hen is thirteen. After the weather becomes warm, even a small hen will cover thirteen eggs well, and medium-sized hens will cover fifteen or sixteen eggs and often hatch every one, but early in the season it is better to give a hen eleven eggs or perhaps only nine. The number of eggs given a hen is almost always an odd number. There is an old superstition that an even number will not hatch. The reason commonly given by writers on poultry is that an odd number of eggs arrange in better form in the nest, but this is mere fancy. However the practice started, the real reason why odd numbers of eggs are placed in nests of sitting hens now is that the custom is so well established, and the habit of thinking of eggs for hatching in odd numbers is so strong, that most poultry keepers do it unconsciously.

Care of sitting hens. The best food for sitting hens is whole corn. As the hen will leave the nest only once a day, and not always daily unless removed, the food is given in a vessel from which she can eat it readily. The usual way is to keep a supply where the hens are, so that whenever they leave the nest they can get something to eat. Whether to let them choose their own time to leave the nest or to keep the nests closed except when they are let off at a regular time each day is a point to be determined in each case according to the circumstances. If all the hens in the same place are quiet and get along well together and do not quarrel for the possession of particular nests, they may be left very much to themselves ; otherwise the poultry keeper should regulate things so that there will be no quarreling and no danger of a nest of eggs getting cold while two hens crowd on another nest and break some of the eggs in it.

Besides grain the hens need water and a place to dust. Most sitting hens will dust themselves every time they leave the nest, if they have an opportunity to do so. As lice multiply rapidly

on sitting hens, it is a good idea, even when the hen can dust herself, to apply an insect powder to her and to the nest two or three times during the period of incubation.

The eggs may be tested at the end of the seventh day by using a light, as described on page 21. While fertility can be determined earlier, waiting until the seventh day enables one to tell more surely whether fertility is strong or weak, and to discard weak germs as well as infertile eggs. An infertile egg is clear, that is, shows no signs of development or decay, at every period of incubation. The eggs that rot are fertile eggs in which the germs have died. A rotten egg is distinguished from a fertile egg through the tester by the movement of the line between the transparent air space at the large end of the egg and the dark contents, this movement showing that the contents are in a fluid state. The eggs which are the most opaque and have the air space most distinctly marked are those which have the strongest germs. Eggs that are conspicuously light-colored (as they appear before the light) when compared with these may as well be discarded. If many eggs are discarded, those that remain may be given to a part of the hens, and the rest of the hens reset.

Attention at hatching time. The eggs of medium-sized fowls usually hatch in from twenty to twenty-one days. The eggs of small fowls take about a day less, and those of large fowls about a day more. Hens' eggs have been known to hatch as early as the seventeenth day and as late as the twenty-fourth, but as a rule chickens that come before the nineteenth day or after the twenty-second are weakly. Hens sometimes trample the chickens in the nests or crush the eggs after they are picked, so that the chicken cannot turn to break the shell in the regular manner. Sometimes this is due to the nervousness or to the clumsiness of the hen, but oftener it is caused by the nest being too much dished (that is, hollowed so much that the eggs tend to roll toward the center) or by lice disturbing her. The chickens may be saved either by removing them to other broody hens or by

putting them in a flannel wrapping in a warm place. Unless, however, the conditions are bad, it is better to leave them with the hen. Hens with little chicks should be left in the nests until

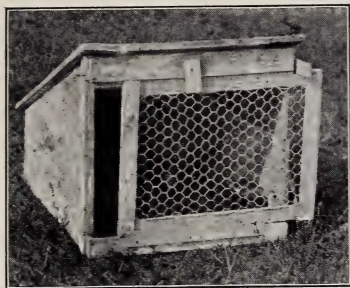


FIG. 93. Coop for hen and chicks, to be used without run

all the eggs that will hatch have hatched and the chicks are dry and begin to show an inclination to run about. Then, if the weather is fine, the hen and her brood may be taken at once to a coop out of doors, but if it is cold or stormy, the little chicks are better indoors.

Coops for broods. The coop for a hen and chickens should

be so constructed that they will have plenty of fresh air at night. There should be a small run attached to it, to which the hen can be confined while the chickens run about or come to her to be brooded, as they may wish. It is not a good plan to let a hen run with her brood while the chicks are very small. The chickens do much better if the mother is confined and gives more attention to keeping them warm than to feeding them. The coops should not be placed in the same spot year after year, nor should they be on land upon which the old fowls run during any considerable portion of the year. Sod ground is best.



FIG. 94. Coop to be used with runs, as in Fig. 95

Feeding young chickens. From early times in America the most common food for young chickens has been corn meal moistened with water. When fresh this is a good food for chickens that run about and eat a great deal of green food, insects, worms,

and small seeds, but a mash of scalded corn meal and bran, such as is given old fowls, or a baked johnnycake, is better. There is no need of fussing with such foods as finely chopped hard-boiled eggs, cracker crumbs, pinhead oatmeal, and other things often recommended as most appropriate for the first feeds of little chicks. Healthy hen-hatched chicks raised by the natural method on a farm need nothing but one soft feed (such as has been mentioned) in the morning, a little hard grain toward



FIG. 95. Coops and runs for hens and chicks¹

evening, and then, just before dark, all the soft food they will eat. The best grain for them is sound cracked corn; the next best is wheat. The chickens should have good water always before them, and may be given all the milk they want. Skim milk, sour milk (either thin or clabbered), and buttermilk are all eaten with relish and promote health and growth. Vessels in which milk is given must be cleaned often or they will become very filthy.

¹ Burlap bags are used to shade the interior or to keep out rain. When not in use they are turned back on the top of the coop.

Management of growing chicks. Of course, healthy chickens are growing all the time, and growing at a very rapid rate, too; but after the chicks are weaned, they have usually reached the point in growth when the increase in size in a short period is very noticeable. So poultry keepers commonly speak of chickens from weaning time until maturity as growing chicks. At this time the rudest kind of shelter will suit them as well as any. Indeed, they hardly need shelter from the weather at all. The most essential things are a



FIG. 96. Small house for growing chicks, in Maine orchard

good range, apart from the old fowls, and an abundance of food. They should be able to pick up a great deal of food for themselves, but should have enough given them to make sure that they always have all the food they can eat. It does not pay to stint them to make them forage farther. Young chickens will always take all the exercise that they need if they have the opportunity, and the more they eat the better they grow.



FIG. 97. Small house for growing chicks, in orchard in New York State

When the range near their coops ceases to afford them good picking, the coops should be moved to a place where the food to be secured by foraging is more abundant.

LARGE STOCKS ON GENERAL FARMS

When farmers in America began to keep larger stocks of fowls, the most common practice nearly everywhere was to increase the general flock until there were far too many fowls on the land that they would usually forage over. Under such conditions fowls on the farm were not profitable. They damaged every crop to which they had access, and made the farm most unsightly in the vicinity of the dwelling house. Then some farmers would reduce the flock and return to the old practice of



FIG. 98. Stone poultry house about two hundred years old, on farm of F. W. C. Almy, Tiverton Four Corners, Rhode Island

keeping only a few dozen hens, while others would adopt the city plan of building houses with many compartments and keeping the fowls yarded in small flocks. This plan was usually abandoned within a few years, because, while it worked very well in the winter, when the farmer had time to give the hens extra care, they were not as well off in the summer, when the farmer

had to give attention to his field crops first. Such was the usual course of development of farm methods of managing fowls.

The colony system. But occasionally a farmer whose flock had outgrown its accommodations as one flock would divide it, moving a part to another place on the farm, and so was able to maintain the increase in numbers without adopting laborious methods. This idea was carried out most systematically and most extensively in the vicinity of Little Compton, Rhode Island, where the Rhode Island Red fowl originated. The first settlers in this part of Rhode Island built large stone poultry houses like that shown in Fig. 98. Some of these old buildings are still used for poultry. This district is most favorably

situated for poultry keeping. The snow rarely lies long, and the birds can be outdoors nearly every day in winter as well as in summer. Being near the fashionable summer resort of Newport, the farmers here early found a large demand for their eggs and poultry at high prices in the summer time, when in many places the prices were low. Then in the winter they could send eggs to Boston and Providence, which were the best markets in the country for this class of produce. So these farmers had every inducement to devise a practical method of indefinitely increasing their stocks of fowls. The plan which they adopted was very simple.



FIG. 99. Rhode Island colony poultry house for thirty-five fowls



FIG. 100. Colony poultry houses on Rhode Island farm

Small houses, which could easily be moved from place to place with a two-horse team, and which would accommodate from twenty-five to thirty-five fowls, were made and distributed

over the farm. Sometimes these houses were placed in pastures not suitable for mowing or for cultivation and remained there permanently, but as a rule they were moved from time to time to suit the rotation of crops on the farm. As the number of these houses on a farm increased, and they were spread over a larger area and sometimes placed in fields and pastures a long distance from the farmhouse, the work of caring for the fowls, even by the simple method used, became too heavy to be done by man power alone, and a horse and cart was used in carrying food and water, collecting eggs, and moving chicks and fowls



FIG. 101. Collecting eggs on Rhode Island farm. The little girl is in the box in which dough is carried in the morning

from one part of the farm to another. Thus the work was put on a very economical basis, and keeping fowls by this method became a common feature of the farming of this section of Rhode Island. The methods used here have changed little, if at all, since the system was started sixty or seventy years ago. The system is so primitive that people who are familiar with more elaborate methods often imagine that the Rhode Island farmer, who does so well by his simple methods, would certainly do very much better if he applied more of the modern ideas. But the test of time has demonstrated that this simple colony system is easily made permanent, while most of the more ambitious and complex systems either fail utterly or have but a transient success.

Numbers of hens kept. The number of hens kept on a farm in this section varies from four or five hundred to over two thousand. Stocks of from eight hundred to twelve hundred are most common. The principal object is to produce market eggs, but as the two-year-old hens and the cockerels that are not needed for breeding purposes are sold every year, the receipts from the sale of live poultry are sometimes considerable.



FIG. 102. Colony houses at Michigan Agricultural College. (Photograph from the college)

Feeding, care, and results. The hens, being well distributed over the farm, pick a large part of their living. Hard grain (usually cracked corn) is kept always before them in the house, in hoppers which will hold a bag of grain each. Once a day, in the morning, the hens are given a feed of mash (or, as it is called in this locality, dough) of about the same composition as the mash described on page 89. The dough is cooked in a large iron set-kettle in the evening and left there until it is to be fed the next morning. Then it is loaded into boxes or large

tubs on a cart. The cart also carries a barrel of water. As he reaches each house the driver, with a shovel, throws what dough the hens need on the grass near the house. Then he fills the



FIG. 103. Moving one of the houses in Fig. 102

water pail and drives on to the next house. The hens require no more attention until evening, when the man collects the eggs and gives more water where it is necessary.

Some of the smaller stocks of fowls on these farms — flocks that have been selected with care and are given a little more attention than is usual—give an average annual production of



FIG. 104. Colony houses at Iowa Agricultural College. (Photograph from the college)

eleven or twelve dozen eggs a hen, but the general average is only eight or nine dozen. Although the profit per hen is small, the compensation for labor and investment is better than on

most poultry plants where a much greater product per hen is secured. Even when eggs are the most important money crop on the farm, the care of the laying hens is but a small part of the day's work of the man who looks after them.

How the chickens are grown. The number of chickens reared each year on one of these colony farms is usually about equal to the number of fowls kept. Where there are so many hens of a sitting variety, and very early hatching is not practiced, there is rarely any shortage of sitting hens at the time when they are wanted. Usually twenty or thirty hens are set at the same time, and it is expected that they will hatch eight or ten chickens



FIG. 105. Colony houses at Hampton Institute

each. Sometimes sixty or seventy hens are set at one time. As it is almost always quite warm when the chickens are hatched, it is customary to give each hen twenty or more chickens. The coops are placed in rows, several rods apart each way, on a piece of grassland that has had no poultry on it for a year or more. Most of the farmers are very particular on this point, and prefer to put the young chickens on land on which there has been no poultry for at least two years. They have learned by experience that under such conditions they can rear a much larger percentage of the chickens hatched, and that the chickens will grow more evenly and mature earlier. In planning the field crops grown on the farm they always try to arrange so

that the small chickens may have fresh land not too far from the farmhouse; land seeded to grass the year before is best.

The chickens are fed the same dough as is given to the hens, but are fed oftener. They have a second meal of dough about noon, and their grain supply, which is given in small troughs, is replenished frequently. While the hens are with the chickens the food is placed where the hen confined to the coop can get her share. After the hens are taken away, the dough is thrown on the grass as the cart passes up and down the rows of coops.

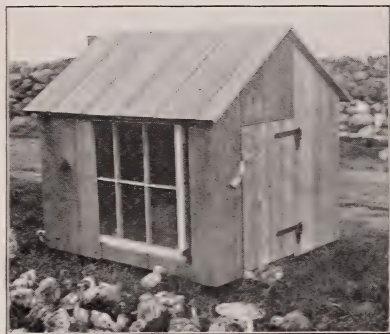


FIG. 106. Coop for hen and chicks, used on Rhode Island farm

When the hay has been harvested and the corn has grown tall, a part of the young chickens may be removed from the land where they were started, and the coops placed where they can forage on mowing lands, in cornfields, and wherever they can go without damage to a growing crop. As they become too crowded in the small coops, the cockerels are sold and, if there are still too many birds in a coop, a few pullets are taken from each of the overcrowded coops and new colonies are started, so far from their old associates that they will not find their way back.

In the early fall as many of the oldest hens are sold as is necessary to vacate the houses needed for the pullets reared that season. Then the houses are



FIG. 107. Colony house for growing chicks, at Macdonald College. (Photograph from the college)

thoroughly cleaned. (They may not have been cleaned before for six months or a year.) If a house is to be moved to a new location, the change is usually made at this time. One or two cartloads of clean sand are put into each house, to make the floor higher than the ground outside and to provide an absorbent for the droppings which are allowed to accumulate. When they are brought to the house, which will probably be their home as long as they live, the pullets are confined to the house, or a small temporary yard is attached to it, so that they cannot wander away. After a few days of confinement they accept the new home as their headquarters.

Adaptability of the colony system. The colony system as developed in Rhode Island attracted little attention elsewhere until very recent years. Since about 1900 many descriptions of it have been published, and numerous efforts have been made to adapt features of this system to operations in other localities. The principal obstacles to this are snow and predacious animals. Where snow lies deep for months it is not practical to keep fowls in widely distributed flocks in winter. In some places the plan of distributing the houses in summer and parking them (that is, placing them close together in a regular order) in winter has worked very well. Where wild animals are numerous, colony methods cannot be extensively applied, but on most farms a limited application of the system will greatly increase the amount of poultry that can profitably be kept.

In England many farmers use smaller colony houses than those in use in Rhode Island, and move them often, not letting a house stand in the same spot long enough to kill the grass. Some of the houses used in this way are provided with small wheels. The advantage of moving houses often is greatest when the fowls are on good arable land, upon which there are, or will be, crops that can utilize the manure which the birds leave on the land. If the houses are moved methodically, the fertilizer will be evenly distributed.

INTENSIVE POULTRY FARMS

Reasons for concentration. In the early days of the poultry fancy in this country the tendency was for each fancier to keep as many different varieties as he could find room for or could afford to buy. Most of these fanciers were city people who thought that, as they kept their fowls in small flocks anyway, they might just as well have as many different kinds of poultry



FIG. 108. Colony houses in foreground ; sheds for ducks beyond. (Photograph from Bureau of Animal Industry, United States Department of Agriculture)

as they had separate compartments in their poultry yards. When rich men with large estates became interested in fancy poultry, they usually built large houses containing many small pens, each with its small yard, and bought a few of each known variety. By far the greater part of the choicest poultry was kept in small inclosures, and the flocks that laid remarkably well were usually city flocks that were given good care. This seemed to a great many people to prove that fowls did not need the room and the freedom which for ages they had enjoyed on farms, and that the limit of the possible extension of the city method of

keeping fowls in small, bare yards depended in any case upon the business capacity of the poultry keeper.

Concentration not profitable. Very few people who have not had experience in growing large numbers of poultry under both good and bad conditions can be made to understand how futile industry and business methods are when many other things which affect results are unfavorable. Even when the obstacles to the application of intensive methods on a large scale are pointed out to them, most novices imagine that the difficulties are exaggerated for the purpose of discouraging them. They think that the successful poultry keeper wishes to discourage



FIG. 109. Commercial laying house at New Jersey Experiment Station.
(Photograph from the station)

competition, and that the person who has failed does not want to see any one else succeed, and so warns others to let such projects alone. Those who have been very successful in their first efforts in a small way seldom lack perfect confidence in their ability to make good on any scale if once they are in a position to devote themselves entirely to this work.

For some seventy or eighty years, but more especially for the last thirty or forty years, the most conspicuous phase of the poultry industry in America has been the widespread and continuous movement to develop large plants of this character. There has been no time, for a quarter of a century, when poultry plants of this kind, which to the uninitiated appeared to be highly

profitable, have not been numerous. The owners of many of these plants have claimed that they were making very large profits, and their claims have led others to engage in the business, following in every detail the methods in use on some large plant which they suppose is very successful. So, while well-informed poultry keepers know that these methods are not practical on a large scale, except in a few limited lines of production, there is

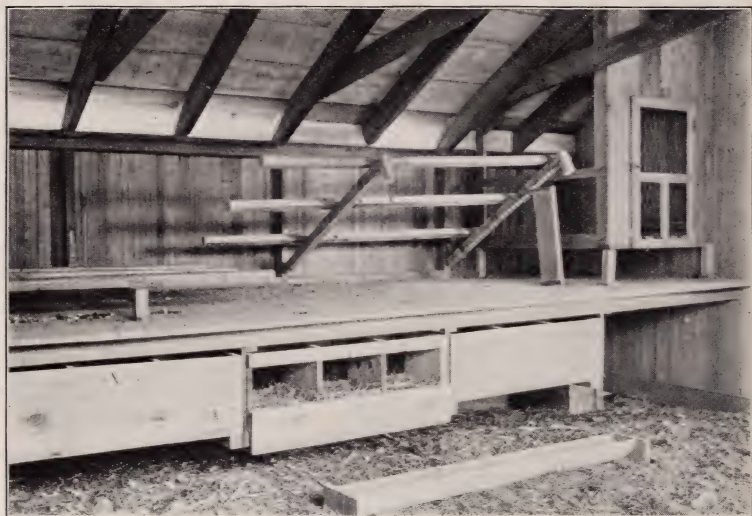


FIG. 110. Interior of a compartment in commercial poultry house, United States Government farm, Beltsville, Maryland. (Photograph from Bureau of Animal Industry)

in the business a constant succession of newcomers who try to operate egg farms and breeding farms and combinations of various lines by methods that are not suited to their purpose.

Common type of intensive poultry farm. The ordinary special poultry farm is a run-down farm upon which have been erected the buildings necessary for the accommodation of from four or five hundred to two or three thousand fowls kept in comparatively small yards. The buildings are nearly always neat and substantial, the fences strong and durable. The arrangement of

the plant is orderly, and, when well stocked with fowls and kept clean, it presents a most attractive appearance. The houses and yards for adult stock, the incubator cellar and the brooder houses, the barns and sheds, and the dwelling of the owner or manager occupy but a very small part of the farm — usually from one to three acres. The young chickens are grown year after year on the nearest land not occupied by the permanent buildings and yards. In most cases the land is so heavily stocked with them that they secure almost nothing by foraging.

The routine of work on such a farm is very exacting. The fowls can do so little for themselves and require so much extra care that the poultry keeper knows from the start that he cannot make his business pay unless he gets a very high production. So all his efforts are devoted to this end. He uses labor-saving appliances, carefully systematizes his work, and by great effort often succeeds in making a fair profit for a few years. It is at this stage of his progress that the poultry keeper of this class does the boasting which misleads others. Then things begin to go wrong with his stock. His eggs do not hatch well, because his chickens, while nominally on free range on a farm, have really been no better off than chickens reared under ordinary conditions in town. His chickens do not thrive, because they are weak and the land is tainted. He himself is worn out with long hours of work and no holidays, and if he does not realize his mistake and close out the business in time, it is only a question of continuing until his income and credit combined no longer suffice to keep the business going.

This in brief has been the history of all special poultry farms where intensive methods were used, except the duck farms and the several classes to be described farther on in this chapter. By no means all succeed to even the extent described, because a great many people who go into the business have so little capital that they have to give up the business before they have been able to make it show a profit. When the owners have capital, plants

are sometimes operated for years at a loss, but it is very rare indeed that a poultry farm of this kind (except in the classes to be described later) is continued for more than seven or eight years, and few of them last five years. Those who wish to make a poultry business permanent must adopt other methods.

BROILER GROWING

The desire for what is rare and costly is a common trait in human character. In nothing is it more plainly displayed than in the demand for food products out of their natural season. An article which in its season of abundance is a staple article of diet, within the means of all but the very poorest, at its season of scarcity becomes a luxury which only the wealthy can afford.

Before cold-storage methods had been brought to high efficiency, there was a period in the latter part of the winter and the early spring when young chickens were very scarce. The number that could be hatched with hens to meet a demand at this season was small, and those who were hatching autumn and winter chickens by the natural method found it more profitable to keep them to sell as roasters late in the spring and early in the summer.

The "broiler craze." A little before 1890, artificial incubators being then first brought to a perfection which made them popular, some poultry keepers began to hatch chickens in the winter to meet the demand for early broilers. Those who were successful made a very good profit on what chickens they had ready to sell while the prices were high. Most of them operated in a very small way, taking up this work simply for occupation when they had nothing else to do. Many were gardeners who had just about enough slack time, after the harvest of one year was over, to hatch and grow one lot of broilers before beginning their regular spring work.

These people were not under any delusions about the limitations on this line of production. They knew that the demand for very small chickens at very high prices was limited and easily satisfied. But, as usual, the published accounts of what they were doing set a great many people to figuring the possibilities of profit from such a business conducted on a large scale. For a few years the broiler craze affected nearly every one interested in poultry keeping. Thousands who never engaged in it were restrained only because of lack of capital or inability to adapt it to their circumstances. Many people who had been through several unsatisfactory ventures in poultry keeping thought that they saw in this the one sure road to wealth, and began to make plans to grow broilers in large quantities. Besides these business ventures there were countless small ones, sometimes conducted under the most unsuitable conditions. People tried to grow broilers in living rooms, in attics, in all sorts of unheated outbuildings, and in house cellars to which the daylight hardly penetrated.

Present condition of broiler growing. The production of broilers as a specialty did not last long. The improvement in cold-storage methods soon made it possible for speculators to carry over large quantities of summer chickens, and the poultry keepers in other lines could easily arrange to produce all the fresh broilers that could be sold at a good profit.

ROASTER GROWING

Description of a good roaster. To roast nicely, a fowl must be full-grown and well filled out, but young, soft-meated, and fat. A fowl is "ripe" for a choice roaster for only a short period after arriving at maturity. When a pullet has laid a few eggs, her flesh becomes harder and is never again as tender and juicy as it was before she laid an egg. When the spurs of a cockerel begin to harden and to grow a long, sharp point,

and the bird becomes boisterous and quarrelsome, the flesh becomes dry and tough and is not fit for roasting.

General and special supplies. From July, when the earliest farm chickens are large enough for roasting, until about the first of February, when the last of the late-hatched farm chickens disappear from the markets, there are nearly always enough very good roasting chickens in the general market receipts to supply the demand for that class and grade of poultry. Then for four or five months there are no fresh roasting chickens on the market



FIG. 111. Massachusetts soft-roaster plant

except those grown especially for this trade. This line of poultry culture was developed first near Philadelphia, in southern New Jersey and eastern Pennsylvania, about forty years ago. The chickens were hatched with hens in the autumn and early winter, each grower having only a few hundred. They were sold not only in Philadelphia but in New York and Boston, and in smaller Eastern cities where there was a demand for them. They were, and still are, commonly known as Philadelphia chickens.

Large roaster plants. After incubators came into common use, the production of Philadelphia chickens increased, but a more remarkable development of that line of production took place in Plymouth County, Massachusetts, just about the time

the broiler craze started. The growing of winter chickens had been carried on to some extent in southern New England in the same way as in the vicinity of Philadelphia, but the local supply was small and irregular until artificial methods were adopted. Then, quite suddenly, the industry developed extensively in the vicinity of Norwell, Hanover, and Rockland. Its growth was remarkable, both because of the number of people who were successful on a comparatively large scale, and because it attracted almost no attention outside of this district until long after it had become a well-established local industry.

The methods of the roaster growers in this district are very intensive, but as originally developed their business was not a continuous line of intensive poultry culture, nor is it continuous now except in some cases.

For many years after the business began, the growers bought the eggs that they incubated from farmers whose flocks were kept under good conditions and were strong and vigorous; but as the numbers engaged in growing winter chickens increased, the supply of eggs from the farms was not sufficient, and some of the roaster growers began to keep hens to supply a part of the eggs they used. Later some produced all the eggs for hatching that they needed for their own use, and a few sold to others also. This, however, can be done only by those having quite large farms. Some of the most successful growers have only a few acres of land and do not attempt to keep breeding fowls.

Hatching begins in August or September and is continued until all the chickens that can be handled are hatched. If the eggs hatch well from the start, a large grower may have his



FIG. 112. Incubator cellar

houses full by December, but usually it takes until January to complete hatching, and sometimes it takes longer. The price paid for eggs for hatching is only a little above the price of



FIG. 113. House used for growing roasting chickens

market eggs, and the buyer takes all the risks of poor hatches. The chickens are kept in warm brooder houses as long as they need artificial heat, then they are removed to cold brooder houses of the same type or to colony houses. Those who have land enough use mostly colony houses. While in the heated brooder houses the chickens are fed

in the regular way—with mixed ground grains, either dry or moistened, and small whole or cracked grains. After they leave the brooder houses they have cracked corn, beef scrap, and water always before them; for green food they have cabbage or the winter rye or grass growing on the land.

As the object of the grower is to have chickens that will grow large and remain soft as long as possible, the breeds used are



FIG. 114. Group of houses like that in Fig. 113

principally Light Brahmas and Plymouth Rocks, although when eggs of these varieties cannot be obtained in sufficient quantities, Wyandottes are used. The cockerels are caponized when they are about two months old. A capon does not grow a comb or

spurs, nor does it crow. If a perfect capon, it remains always soft-meated and may grow very large, though it does not, as is commonly supposed, grow larger than a cockerel within the time it is usually kept before being killed. An imperfect capon will after a time grow a comb and short spurs and, though sterile, becomes harder in flesh than a perfect capon. An imperfect capon is technically called a *slip*.

About the first of March some of the earliest pullets may begin to lay. From that time all the pullets that begin to lay, and the slips as they appear, are marketed; all others are kept, because the grower realizes the largest profit on those that can



FIG. 115. Petaluma egg farm. (Photograph from Bureau of Animal Industry, United States Department of Agriculture)

be marketed in June and July, when the price is highest. By the middle of July, at the latest, everything is sold. The poultry keeper then begins to prepare for the next crop of chickens by taking up all his fences, plowing land that is not in grass, and planting it with winter rye or cabbage or some late garden crop. Rye and cabbage are preferred, because the rye will remain green all winter and furnish green food for chickens that have access to it, and the cabbage makes the best of green food for the little chickens in the brooder houses. It is just as good for the others, too, but not many of the poultry keepers grow enough to continue feeding it to them throughout the winter.

While the land on these plants is heavily stocked with poultry, the birds are on it only half of the season, — when vegetation grows freely, — and during the remainder of the season a great deal of manure is removed from the soil by gross-feeding crops like rye and cabbage. So the land may be heavily stocked longer than it could be if fowls were on it all the time. The chickens grown in this way do not usually grow so large as those that are



FIG. 116. Group of houses on a Petaluma egg farm. (Photograph from Bureau of Animal Industry, United States Department of Agriculture)

given more room, but they are grown at less cost and are as large as the market demands. By this method the land will carry a large crop of chickens year after year for many years, yet it finally becomes so contaminated that chickens do not thrive on it.

INTENSIVE EGG FARMING

Still another important development due to artificial incubation took place in California. The climate of the Pacific Coast is well suited to fowls of the Mediterranean class, the cold never being severe enough to affect their large combs. Hence these

fowls early became very popular with farmers in this section, but as they were non-sitters, those who kept them had to keep hens of another breed to hatch and rear the chickens. When an incubator factory was established at Petaluma, California, the farmers in that vicinity began to use incubators, and some small egg farms grew up in the town. White Leghorns were kept almost exclusively. Before long the egg industry here had grown to such proportions that it was the most important local industry, and the district became celebrated as a center of egg production. Although the product is different, and a different type of fowl is used, the conditions at Petaluma closely resemble those in the roaster-growing district of Massachusetts. The special egg farms are small, each containing from five to ten acres. The houses for the laying hens are larger than the colony houses used in Rhode Island, and are arranged in groups of three, each group containing about five hundred hens.

The egg farmers grow their own pullets but, as a rule, do not breed or hatch them. The hatching is done by custom hatcheries, the eggs coming from flocks of White Leghorns on farms that do not specialize in poultry but keep a flock of Leghorns under more favorable conditions than exist on the egg farms. Here, as in the Massachusetts district, the bad effects of intensive methods are reduced for a time, because the fowls affected by them are not used for reproduction.

POULTRY FANCIERS' FARMS

A large proportion of poultry fanciers are city people who have very little room for their fowls. Some have no room at all for growing chickens, although, by giving them the best of care, they can keep a small flock of adult birds in fair condition. Such fanciers have to find farmers to grow chickens for them. This is not so easy as is commonly supposed, for the farmers who are sufficiently interested in poultry to give them

the care required to make good exhibition birds usually want to give their own birds all the time they can spare for work with poultry.

So it happens that, after a few years' experience in keeping fine fowls in close quarters, an amateur fancier almost always wants to move to a farm where he can grow more and better chickens. A small farm near a city suits the average fancier best, because, when so situated, he can continue his regular work and



Fig. 117. Yards of a small poultry fancier

look after his poultry in leisure time. Fanciers generally use houses with many pens under one roof, because, even when they have only one variety, the different matings must be kept separate during the breeding season, the adult males must be kept separate at all times, and valuable hens cannot be kept in large flocks except when damage to plumage may be remedied before they are to be exhibited or sold. A fancier will keep only five or six birds, and sometimes only two or three, where a utility poultry keeper would keep a dozen. If the yards connecting with the pens in the houses are small, he will arrange

so that each lot of fowls may have access to a large yard daily or on alternate days. In every way practicable the experienced fancier arranges to give his fowls all the advantages of natural conditions, while isolating them as completely as is necessary to keep each individual in perfect condition.

Poultry farms that were started as intensive market-poultry or egg farms are sometimes converted into fancy-poultry farms. This is very likely to be the case if thoroughbred stock is used and the owner becomes skillful as a breeder. If he can breed fowls of a quality to command high prices, he may be able to produce enough of them on a small farm to make a very good living, when it would be very much harder, or perhaps impossible, to make the farm profitable with ordinary stock.

While farmers usually care more for horses, cattle, sheep, and hogs, many

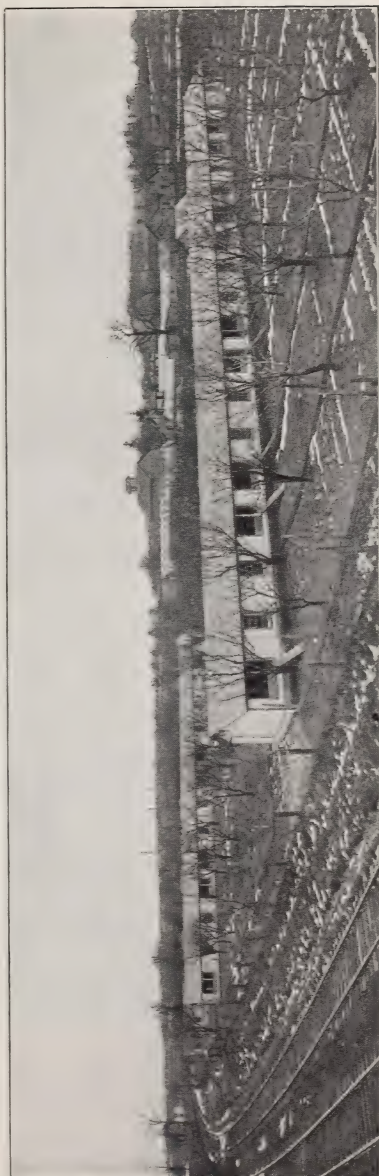


FIG. 118. Large fancy-poultry farm

become interested in poultry, and if they are natural fanciers and good business men, it often happens that the growing of fancy poultry becomes one of the most important industries on the



FIG. 119. Growing chicks in a fancier's yard

farm. Many women on farms become interested in fancy poultry, and some become very skillful breeders and exhibitors. A farmer-fancier's poultry plant is usually a combination of



FIG. 120. Young stock in cornfield on a fancier's farm

extensive and intensive methods. Some buildings with small compartments must be provided, but all except the choicest birds can be managed just like the ordinary fowls on a farm

where arrangements are made with a view to giving them the full advantage of the good conditions which the place affords.

To a novice in fancy-poultry culture the number of chickens grown by expert fanciers seems very small for the equipment and the land used, but the old fancier has learned in the costly school of competition, by the bitter experience of defeat, that



FIG. 121. Summer quarters for poultry. (Photograph from New York State Agricultural College at Cornell University)

in growing exhibition poultry it pays to give the birds a great deal more room, both indoors and outdoors, than is needed simply to get quick growth and good size. Elegance of form, depth and brilliance of color, and the indefinable qualities of style and finish that distinguish the high-class exhibition fowl are obtained in a much larger proportion of birds when they are given a great deal more room than they apparently need.

CHAPTER VI

DUCKS

Ducks rank next to fowls in economic importance. If there were no fowls, domestic ducks would probably be as numerous as fowls are now, for it is much easier to produce eggs and meat from ducks than from any known species of gallinaceous bird except the fowl. To most people who are not accustomed to eating them, neither the flesh nor the eggs of ducks seem quite as palatable as the flesh and eggs of fowls. On the other hand, people accustomed to eating fat ducks and the eggs of ducks, which contain a much higher percentage of fat than hens' eggs, often consider the flesh and eggs of fowls rather insipid. The feathers of ducks are more valuable commercially than those of fowls but are not correspondingly profitable to the producer, because ducks are much harder to pluck.

Description. Common ducks are about the same size as common fowls. The improved breeds vary greatly in size but do not present such extremes of size and diversity of form as are found in the races of fowls. As the duck in a state of nature lives much upon the water, its form is at nearly every point different from the typical form of the fowl. The duck is usually described as boat-shaped, but, while this is a good description, it would be more correct to say that a boat is duck-shaped. The duck was the natural model for the first builders of boats.

The bills of ducks are large, rather flat, and broad at the tip. The species to which most of our domestic ducks belong has no head ornaments corresponding to the comb and wattles of the fowl. There is one variety of this species which has a

topknot, or crest. The Muscovy Duck, which is of a different species, has a bare face with a carunculated red skin. The plumage of ducks is very soft and dense, forming a thick covering which, when the feathers are in a natural position, is impenetrable to water and so perfect a protection from wind and cold that hardy ducks are quite indifferent to keen winds and low temperatures, and, if left to themselves, rarely seek shelter in winter. During a heavy snowfall they will get under cover to escape being buried in the snow. At other times they seem quite as comfortable on snow and ice as on the ground. One of the most interesting sights of the poultry yard is to see a duck sit down on the snow or ice when the temperature is below zero, draw up its feet and work them into the feathers at the side of its body until they are completely covered, tuck its bill into the feathers of its back until only the nostrils and a little of the base of the bill are exposed, and remain this way through the coldest nights rather than go a few feet to a comfortable house with warm bedding on the floor. Being better adapted to cold than fowls, they are, as would be expected, much more susceptible to heat and suffer greatly in hot summer weather if exposed to the sun or kept where there is not a good circulation of air.

The tails of ducks are short, spread laterally, and are usually folded close and carried with the tip a little higher than the base. The legs are very short, comparatively slender, and weak. Most ducks walk awkwardly and fall down and flounder about helplessly when they try to run. The legs of a duck are so weak that it is not safe to catch or handle them by the legs, as fowls are usually caught and handled. It is very easy to break or dislocate the leg of a duck in this way. Hence, the usual method is to catch and carry them by the neck, which is very strong. Most persons who are not used to handling ducks are afraid of choking them by grasping the neck firmly, but there is very little danger of this. The feet of a duck are webbed between the forward toes, which makes them more serviceable as

paddles in swimming. They are not suited to perching. There is a wild tree duck, and it is said that the domestic Muscovy Duck sometimes alights in trees or on objects above the ground, but the familiar kinds of ducks rest only on the surface of the land or on the water.

Although the males average a little larger, the male and female of the same stock are usually nearer the same size than in gallinaceous birds. The only marks by which sex can be distinguished in all ducks are the voice and the presence or absence of the small curled feathers on the tail which characterize the males. In party-colored varieties the color markings of the male and female are sometimes different. The "quack" of the duck is the note of the female; the male makes a very subdued similar sound, comparing with it as a hoarse whisper compares with the natural tones of the human voice.

The duck derives its English name from its habit of ducking its head into the water in search of food at the bottom of the shallow waters, which it prefers. The term "duck" is applied to males and females collectively, and also to the female as distinguished from the male. The male is called a *drake*. The name "drake" is supposed to be derived from an Old German word meaning "the chief duck." Any one who is familiar with the habits of ducks will see at once the appropriateness of the term. Ducks often march in single file, and when they do so, all the drakes in a group go first, the ducks following them, usually with a little space between. So if there is only one male, he marches a little ahead of his flock, like a commander. Young ducks are called *ducklings*, the name being applied to both sexes. In our language there are no special terms applying to a young duck and a young drake as distinguished from adult birds.

Origin. Useful domestic ducks are of two species. All the breeds of this class, except the Muscovy Duck, are derived from the wild Mallard Duck, specimens of which are still frequently captured and domesticated. The Mallard takes very readily to

domestication. Although in the wild state it is a migratory bird, in domestication it soon becomes too heavy to fly far. After a few generations in domestication it becomes as large as common domestic stock, loses its power of flight, and cannot be distinguished from stock that has been domesticated for centuries. Mallard Ducks captured in the wild state and kept in captivity have been known to lay from eighty to one hundred eggs in a season, which is as many as the average domestic duck lays.

When ducks were first domesticated is not known. The figure of a duck was used in the earliest Egyptian hieroglyphics. As

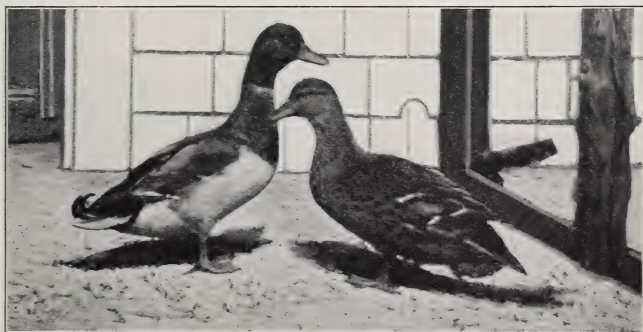


FIG. 122. Domesticated Mallard Ducks, Brook View Farm, Newbury, Massachusetts

the Mallard is widely distributed and so easily tamed, and as domestic ducks of the same type (but apparently not related in domestication) are found in widely separated parts of the earth, it is plain that the distribution of domestic ducks has been less dependent upon the movements of the human race than the distribution of the fowl. Wherever at any time in the history of the world male and female wild Mallards happened to be caught and kept in captivity, a domestic race might be developed. A missionary who went to Africa in 1885 and worked among the Bakubas — a people more than a thousand miles from the west coast of the continent — reported that he found there such little mongrel fowls as are common elsewhere in Africa, and a local

race of domestic ducks varied in color as are the common ducks of Europe and America, but as large as the Rouen and Pekin ducks. The Bakubas had had so little intercourse with civilized peoples that it was not at all likely that an improved race of ducks had been introduced from the outside world, and whatever possibility of that might be supposed to exist, the fact that the ducks of this country, like the domestic quadrupeds, were dumb indicates that they are a distinct and very old domestic race.

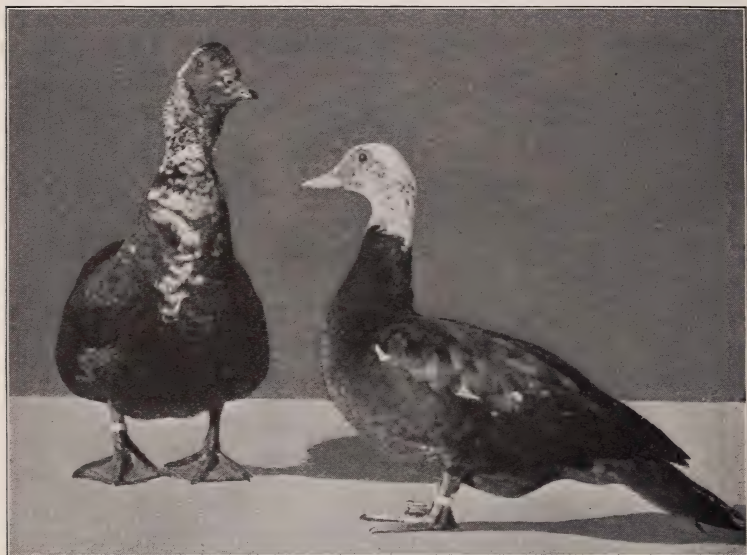


FIG. 123. Colored Muscovy Ducks. (Photograph by E. J. Hall)

It is worth noting in this connection that the missionary, Dr. William H. Sheppard, found it the accepted opinion among this savage people that, by a process of natural selection, the character of dumbness had been acquired by the domestic animals, to which it gave a measure of protection from wild enemies in the forest around them. It seems wonderful that the theory of evolution was found out by such people before it was developed by modern scientists.

The common duck. Like the ordinary mongrel fowl, the common duck (sometimes called the puddle duck, because, when it cannot find water elsewhere, it appears to be perfectly satisfied with the filthiest puddles) is much the same in all parts of the world and is a very inferior bird in comparison with ducks of the improved races. Common ducks are usually very slow growers and weigh at maturity from three to four pounds each. As a rule they are very indifferent layers, laying only in the spring. They are of various colors.

Improved races. Nearly all our improved races of ducks are of foreign origin. At the poultry exhibition at Boston in 1849 the only kinds exhibited were the Aylesbury, the Muscovy, and the ornamental Wood ducks.

The Aylesbury Duck is a large white duck developed as a local variety in the vale of Aylesbury, in England. It has a flesh-colored bill, and legs of a pale orange color. Although the favorite market duck in England, and early known in America, it never became a favorite here.

The Muscovy Duck is, as has been stated, of a different species from our other useful breeds. It is a native of South America and is supposed to have been taken to Europe in the seventeenth century. It was probably brought to North America from Europe less than a hundred years ago. It differs from ducks of Mallard origin in several other particulars besides the naked head with its bright-red, carunculated skin. The male is very much larger than the female. The tail is longer and more depressed. There is an entire absence of red pigment in the plumage. The natural color is black and white, unevenly distributed. This variety is called the Colored Muscovy Duck. Many specimens are nearly black. The White Muscovy Duck is an albino variety. By crossing these two varieties a blue variety is sometimes obtained, but, although Blue Muscovy Ducks have been made at various times, fanciers have never taken enough interest in them to encourage the originators to continue their breeding.

The Rouen Duck takes its name from the town of Rouen, in the north of France, though the type seems to have been common over quite a large area and not peculiar to the vicinity of that town. It is like the Mallard in color, and is just such a duck as by good care and selection for size might be developed at any time from common ducks of that color. Rouen Ducks are said



FIG. 124. Rouen Ducks, Brook View Farm, Newbury, Massachusetts

to have been well known in the south of England early in the nineteenth century. When they were brought to this country is not known. Although for a long time they have been familiar to those who attend poultry shows, and have been widely distributed in small numbers, they have never been extensively bred because the Rouen, having dark plumage, is not desirable for the production of young ducks for market. When mature it dresses clean and the quality of its flesh is unsurpassed.

The Cayuga Duck is an improved black duck developed about the middle of the last century in Cayuga County, New York. Some early accounts of its origin stated that it was a domesticated wild black duck, but it is much more reasonable to suppose that it was developed by selection from black and nearly black common ducks.

The White Pekin Duck is a Chinese breed closely resembling the Aylesbury Duck of England. It has an orange-yellow bill



FIG. 125. Flock of Pekin Ducks

and legs. No large ducks of other colors than white have ever been brought to this country or to Europe from China. As far as is known, the importations from China to England and the United States consisted of only a few birds and were made about 1872–1875. Information about these is not very definite. The most commonly accepted version is that they were brought to England in 1874 and to the United States from England in the following year, but some accounts say that both England and America received them direct in 1873, and one account places

the first importation to England in 1872. The exact truth is not of importance in such a matter, but those who are interested in the remarkable developments in duck culture which followed the arrival of this breed in the Western World naturally wish to know the facts. All accounts agree that there were only a few ducks brought from China. In England the Pekin became quite popular at once. It was hardier and more prolific than the Aylesbury, and was used largely in outcrosses, to give vigor to

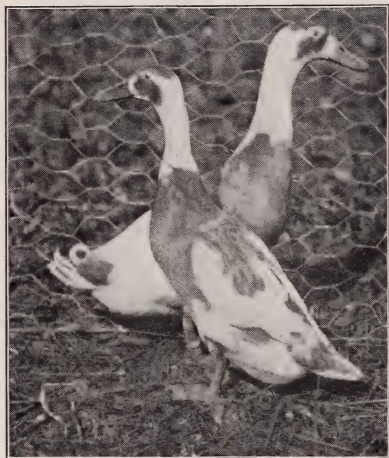


FIG. 126. Indian Runner Ducks. (Photograph from owner, Clayton Ballard, White Pine, Tennessee)

Aylesbury stock. In America it became immensely popular in a few years. It was found to be remarkably well adapted to intensive methods of poultry keeping, and large duck farms were built up; some of these made very large profits for long periods of years.

The Indian Runner Duck is a small, active duck which originated long ago as the common duck on the meadows of certain marshy districts in the Netherlands. The peasants of these districts compelled their ducks to forage

for their food, and so developed ducks with a more upright carriage and stronger legs than the other races. In the Netherlands these ducks are of all colors.

Ducks of this type, in color white with fawn-colored markings, were introduced to poultry fanciers in England in 1893 or 1894 as Indian Runner Ducks. It was said that they had been first brought from India to Cumberland fifty or sixty years before, and that ever since that time they had been bred pure by a few breeders and more or less mixed with the common stock of that

section by many others. The story of their history in England is much more plausible than that of their origin in India. When the breed was shown on the Continent of Europe it was at once recognized by fanciers there as an improved variety of a common duck.

Compared with other ducks the Indian Runner is a remarkable layer, but it does not, as many admirers of the breed claim,



FIG. 127. Flock of White Indian Runner Ducks. (Photograph from Bureau of Animal Industry, United States Department of Agriculture)

surpass fowls in egg production, and the market for duck eggs is so limited that it is easily overstocked.

Blue Swedish Ducks and Buff Orpington Ducks are simply color varieties of an improved type of the common duck. There are several other quite well-marked varieties in Europe that have not been seen in this country.

Ornamental ducks. The ornamental ducks of the same species as the common duck, and derived either from common ducks or directly from the Mallard, are the East India Duck, the Black, White, and Gray Call Ducks, and the Crested White Duck.

The Call Ducks are so named because their persistent quacking makes them valuable for calling wild ducks within range of the guns of hunters, and they are much used as decoys. They are very small and were produced by dwarfing common ducks. The name "gray," to describe the colored variety, is misleading. The color is like that of the Mallard but of a lighter shade. Some Mallards are quite as gray as the average Gray Call Duck. The Black East India Duck is a dwarf black duck differing so little

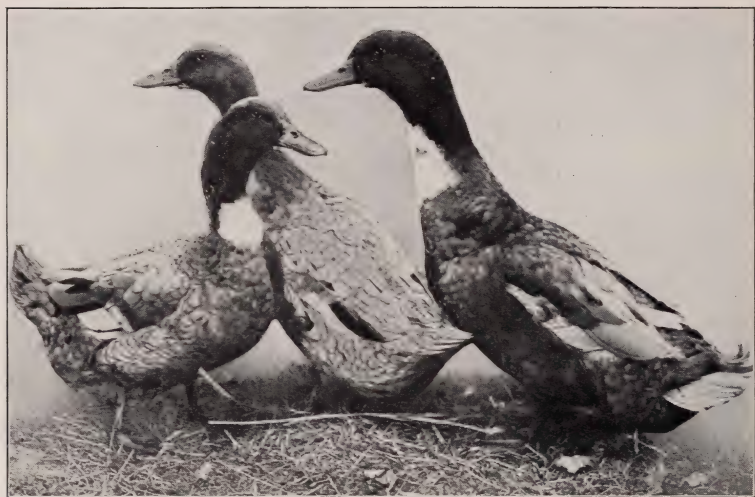


FIG. 128. Blue Orpington Ducks. (Photograph from owner, Sunswick Farm, Plainfield, New Jersey)

from the Call Ducks as to leave no doubt, in the mind of any one acquainted with the mysteries of making and naming breeds of poultry, that, like the Call Ducks, it is of European origin.

There are many ornamental ducks of other species, the most interesting of which are the brilliantly colored Wood Duck (sometimes called the Carolina Duck) and the Mandarin Duck, which, besides being gorgeously colored, has a peculiar crest and has some of the feathers on its wings oddly curved and spread, giving it a singular appearance. Specimens of these ducks are

almost always to be seen in a collection of fancy waterfowl. The Wood Duck is a native of North America, the Mandarin Duck of Northern China.

Place of ducks in domestication. It has been stated that if there were no fowls, the duck would make the best substitute, but as we have fowls in great variety, and as they suit us better than ducks for nearly every purpose for which either might be used, ducks are not often kept in place of fowls. Small flocks of ducks are kept in addition to a flock of fowls, both on farms and by town poultry keepers, either because the owner likes to have them about or to add to the variety of poultry meat for home consumption.

The flocks of ducks so kept are of comparatively little economic importance. The ratio of ducks to fowls is only about one to fifty, and the ratio of values of the products of these two kinds



FIG. 129. Black and White Call Ducks, Brook View Farm, Newbury, Massachusetts

of poultry is probably nearer one to one hundred. But when poultry keeping is made a special business, duck growing gives the surest and the largest profits, because ducks can be grown in large numbers more easily than any other domestic animal. The largest permanently successful poultry farms in the world are the great duck farms of the United States.

To the fancier, ducks are decidedly less interesting than fowls, not only because, as has already been stated, they present fewer superficial characters upon which he can exercise his art, but because they are, on the whole, less intelligent and less capable of developing confidence in one who handles them. Fowls are much easier to handle in the way the fancier must often

handle his birds for thorough examination. As a rule, a fowl quickly learns that it is not going to be hurt, and the more it is handled the tamer it becomes. Young ducks are almost stupidly fearless of the person who feeds them, as long as he goes among them without touching them, but after he catches them they are as stupidly shy. It takes very much more patience to handle ducks as a fancier handles birds than the average human being possesses, and so very few people find them satisfactory for pets after they cease to be a novelty.

Perhaps if the interest in the breeding of ducks for exhibition were greater, stocks of ducks that were free from this timidity could gradually be developed. Individual birds are often found which are not at all shy ; and, as a rule, persistent selection for any quality will eventually make it a race characteristic.

CHAPTER VII

MANAGEMENT OF DUCKS

Although ducks delight in the water and, when they have an opportunity to do so, spend a considerable part of the time in it, they are often kept very successfully where they have no water except for drinking. Some duck breeders, who have kept their ducks for many generations without water in which they could swim, have said that the ducks lost all desire to swim, and that birds of such stock would not go into the water even when they had the opportunity to do so. This statement greatly exaggerates the facts. Any young duck, no matter how the stock from which it came has been kept, will take to the water as soon as it can run about if it is given access to water at that time; but if young ducks are kept away from the water until they are several weeks old, and then given access to water in which they can swim, they are often as much afraid of the water as they would be of any object to which they were not accustomed. If they remain near the water, however, it will not be long before they follow their natural instinct to get into it. Having once entered the water, they are immediately as much at home there as if they had always known the pleasures of life in that element.

As comparatively few people keep ducks, and specialization in duck culture is mostly in the line of producing young ducks for market, on a large scale, there is not as much variety in methods of managing ducks as in methods of managing fowls. If ducks are expected to do the best of which they are capable, they must be given a great deal of attention. While no bird will endure more neglect without appearing to suffer, there is none that will respond to good care more generously.

SMALL FLOCKS ON TOWN LOTS

Numbers. The small flock of ducks on a town lot is usually a *very* small flock, kept more from curiosity and for a little variety in poultry keeping than with any definite purpose. Most of such little flocks are composed of a drake and from one to five ducks. Where a larger flock is kept for the eggs they produce, the number rarely exceeds fifteen or twenty. Many town people who want to grow only a few ducks each year prefer not to keep any adult stock, but to buy a few eggs for hatching when they want them.

Houses and yards. Ducks require about the same amounts of house and yard room per bird as fowls. While they will stand crowding better than any other kind of poultry, they appreciate an abundance of room and good conditions, and are more thrifty when they are not overcrowded. Where they can be allowed to remain outdoors at night, they really need no shelter but a shed large enough to give them shade from the sun on hot days and protection from hard, driving storms. On most town lots, however, it is advisable to have them indoors at night for protection from dogs and thieves. Also, the amount of roughing that they like, while not at all detrimental to them, is not conducive to early laying. So most duck keepers prefer to have the ducks housed at night and in severe weather, and give them approximately the same space that would be given to an equal number of fowls.

The floor of the house should be littered with straw, hay, or shavings. The object of littering the floors of duck houses is not to afford them exercise, but to provide them with dry bedding. The droppings of ducks are very watery, and the bedding must be changed often enough to keep the ducks clean. It is customary to provide shallow nest boxes, placing them on the floor next the wall, preferably in a corner. The ducks are quite as likely to leave their eggs anywhere on the floor, or out in the

yard (if they are let out before they lay), but the nests are there if they want them, and many will use the nests regularly.

The only other furnishings needed are a feed trough and a drinking vessel, but it is advisable to have a tub or a pan in which the birds can take a bath, and to supply them with water in this once or twice a week. The drinking vessel must be one that they cannot get into, for if they can get into it they will certainly do so. An ordinary wooden water pail, or a small butter tub with the part above the upper hoop sawed off, makes a very satisfactory drinking vessel for adult ducks. It will hold enough water for the ducks to partially wash themselves, which they do by dipping their heads in the water and then rubbing them on their bodies and wings. For the regular bath for two or three ducks one of the largest-sized bath pans made for pigeons will do very well, or an old washtub cut down to six or eight inches deep may be used. For a flock of eight or ten ducks a good tub may be made from one end of a molasses hogshead. The bath should always be given outdoors, because it takes the ducks only a few minutes to splash so much water out of the tub that everything around it is thoroughly wet. The drinking water should also be given outdoors whenever the houses are open.

As the ducks of the breeds usually kept can hardly fly at all, very low partitions and fences will keep them in their quarters, but to keep other poultry or animals out of their yards it may be necessary to build higher fences. For the heavier breeds, like the Pekin and Rouen, fences are usually made from 18 inches to 24 inches high. The ducks will rarely attempt to go over these, but occasionally a drake learns to climb a two-foot fence by using his bill, wings, and toes, and may then manage to get over a higher fence. For the small, light breeds, fences 3 or 4 feet high may be needed. If their yard is on a slope and is large enough to give them a chance to start a flight high up on the slope, so that they will rise above the fence at the lower side, it may be necessary either to put a very high fence on that side or to cover the yard.

While the fence for ducks need not be either high or strong, there must be no holes in it that a duck, having put its head through, could by pressure enlarge enough to let its body pass. A piece of wire netting that has begun to rust a little may be as good as ever for fowls for a long time, but if used for a duck fence it will be most unsatisfactory, because the ducks will soon make many holes in it. If wire netting alone is used, it should be fastened to the ground with pegs every three or four feet.

Feeding. The feeding of ducks differs from the feeding of hens in that ducks need mostly soft food, and that, if the keeper



FIG. 130. Pekin duckling six weeks old

wishes to force growth or egg production, they may be fed much larger proportions of such concentrated foods as beef scraps and meat meals. As has been stated, in its natural state the duck gets the greater part of its food from the water. This is all soft food, and the bird swallows a great deal of water with it. It does not, therefore, need a large crop in which to soak its food before it passes into the gizzard.

So the crop of the duck is small — merely an enlargement of the gullet. Some of the old books on poultry say that the duck has no crop, but you can see by looking at a duck that has just had a full meal that the food it has taken remains in the passage, sometimes filling it right up to the throat.

With a mash (just the same as is given to hens) morning and evening, a cabbage to pick at, plenty of drinking water, and a supply of oyster shell always before them, ducks will do very well. If they have no cabbage, about one third (by bulk) of the mash should be cut clover or alfalfa. When the days are long, it is a good plan to give them a little cracked corn or whole

wheat about noon. The water supply should always be replenished just before feeding, for as soon as a duck has taken a few mouthfuls of food of any kind, it wants a drink of water.

Laying habits. With the exception of the ducks of the Indian Runner type, which lay some eggs at other seasons, as hens do, ducks usually lay very persistently for about six months, and then stop entirely for about six months. Occasionally ducks of other breeds lay a few eggs in the autumn, but this trait has not been developed in them as it has in the Indian Runner. If they are comfortably housed and well fed, Pekin and Rouen Ducks usually begin to lay in January. If they are allowed to expose themselves to rough weather, and are fed indifferently, they may not begin to lay until March or April. When they do begin, they usually lay much more steadily than hens until hot weather comes, and then gradually decrease their production until by midsummer they have stopped altogether.

The eggs are usually laid very early in the morning. Ducks often lay before daylight and almost always lay before eight o'clock. When a duck lays in a nest, she is very likely to cover the egg with the nest material when she leaves it. A duck will often make a nest and remain on it an hour or more and then go and drop her egg somewhere else and pay no further attention to it.

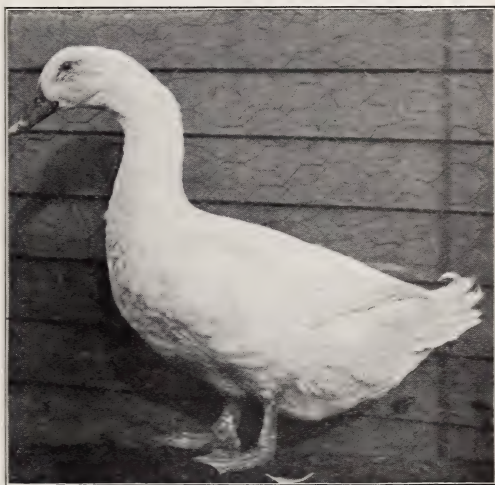


FIG. 131. Pekin drake four months old, weighing nine pounds

Growing ducklings. For a poultry keeper who has only a little room it is much easier to grow a few ducks than to grow an equal number of chickens. There are two reasons for this: One is that the ducklings stand close confinement better and are not so sensitive to unsanitary conditions; the other is that ducks of the improved breeds grow much more quickly than chickens and are grown up before the novelty of caring for them wears off and the keeper tires of giving the close attention that young poultry need when grown under such conditions.

The ducks of the improved breeds are mostly non-sitters. Unless one has common ducks, Muscovy Ducks, Rouen Ducks with some wild Mallard blood, or Mallards not long domesticated, he is not likely to have a duck "go broody," and so small lots of duck eggs are usually hatched under hens. As duck eggs are larger than hen eggs, a smaller number is given to the hen. Eleven medium-sized duck eggs are given to a hen that would cover thirteen hen eggs. If the eggs are large, it is better to give such a hen only nine.

The development of a fertile duck egg that has a white or slightly tinted shell can be seen very plainly when the egg is held before a light, much earlier than the development of a hen egg. If the shell is green and quite dark in color, the development of the germ may not show any better than in a brown-shelled hen egg. The period of incubation is about four weeks. Eggs are sometimes picked as early as the twenty-fifth day, but usually on the twenty-sixth day. As stated in Chapter II, the duckling usually waits quite a long time after chipping the shell before it completes the process and emerges.

In a little duckling we find the most striking resemblance to a reptile that is to be seen among domestic birds. It has a long, soft body, a long neck, short legs, and a wriggling movement, and sometimes, when it is wriggling through a small hole, it looks very snakelike. While they are very small, ducklings are the most interesting of young birds. They will go to the water as

soon as they leave the nest. Dabbling in it will not hurt them in the least if the weather is pleasant, if the water is not cold, and if they can leave it when they are tired and go to their mother and get dry and warm. Much of the pleasure of growing young ducks is in watching their behavior in the water. For this purpose a large pan or a small, shallow tub may be placed in their coop. It should either be sunk in the ground, so that they can get in and out easily, or two short pieces of board should be nailed together at such an angle that they will form a little walk from the ground outside, over the edge of the vessel, and to the bottom inside. This walk enables the ducklings to get out if the water gets so low that they cannot scramble from its surface over the sides of the pan or tub. The best way to teach the little ducks to use the walk is to put a little pile of sods or earth beside the vessel containing the water. The ducks will learn very quickly to go into the water in this way, and will soon find their way out by the board walk. After they have come out by the walk a few times, they will begin to go in by it. It is very important to make sure that if young ducks are given water to play in, they can get out of it easily. Many who have not had experience in handling them neglect this and feel very bad when some of their ducklings are drowned.

If proper provision is made for the safety of the ducklings, they afford a great deal of entertainment. One of the first things a little duck does when it gets into the water is to go through the peculiar ducking performance that gives the name to its species. The little fellows duck their heads to the bottom, and their tails and feet go up into the air while they mechanically feel with their bills for the food which instinct seems to suggest should be there. They play in the water, going through all the motions of feeding in it. If the sun is warm, they are as likely to lie down together in the sun when they leave the water as they are to go to the hen to be brooded. As they lie on the ground they often turn one eye toward the sky and look steadily

upward, as if they knew intuitively that one of their most dangerous natural enemies might appear from that quarter. In every way they comport themselves just as old ducks do and not at all in the ways of their hen mother.

The young ducks may be fed, as the old ones are, on mash, but should be fed oftener, unless their coops are where they can eat all the grass they want and can get a great many flies, worms, and insects. They are expert flycatchers, and if there is anything in their coop to attract flies, they will get a great many of them. Under such conditions three feeds a day will be sufficient. If they have no grass they should be fed five times daily and should be supplied with tender green food of some kind. For the first few days the mash given them should have a little very fine gravel or coarse sand mixed with it—about a heaping tablespoonful to a quart of mash. At any time after that when the ducks seem dull and weak, a little fine gravel in the mash will usually tone them up.

Little ducks grow very fast and in a few weeks are entirely independent of the hen. At ten or twelve weeks they are fully feathered and almost full-grown, and are ready to be killed and eaten as "green ducks."

SMALL FLOCKS ON FARMS

General conditions. The small flock of ducks on the farm is usually most profitable if it can be given the run of a small pasture or orchard where the birds have good foraging and have access to a pond or stream but cannot wander away. Ducks on the farm are often allowed to run with other poultry. This may do very well if the flocks of all kinds are small and can separate when foraging, but as a rule it is better to put the ducks where they will be away from other poultry. A small flock of ducks properly placed on a farm should require very little food and very little attention. If possible the birds should be free at night,

because the worms and grubs come to the surface in greatest abundance then, and they can get as much in an hour early in the morning as they can in several hours after the sun is high. The principal objections to leaving them out at night are that they may be attacked by animals that prey upon them, and that the ducks may lay their eggs where they are not easily found. The person in charge of the ducks has to use his judgment as to whether the risks in his case are so great that the ducks should be confined at night.

When a flock of ducks on a farm has liberty to wander at will, it often makes a great deal of trouble, because ducks are prone to stop for the night wherever they happen to be when they have eaten their fill late in the day.

Feeding. If the ducks are kept in until they have laid, they should have a little food when they are let out. It does not make much difference what this is. If a mash is made for other poultry, some of it may be given to them. Otherwise, a little whole grain will make them comfortable until they can pick up a more varied breakfast. The best method of feeding the young ducks will depend upon the conditions. As a rule it is better to keep them quite close for the first two or three weeks and feed them well. The ideal way is to coop them on grass, or in a garden where they can get a great deal of green food and worms. Treated in this way they will get a better start and will grow much faster and larger than if they are allowed to wear themselves out by running about while small. On a farm where there is no water near the house, but where there is a stream at a little distance, the young ducks should be so placed that they cannot make their way to this stream. Very small ducks at liberty will often find their way alone to water so far from their home that it was not supposed that they could locate it. If they have an opportunity to do so, small ducks are much more likely than older ones to wander off in search of water, and instinct seems to direct them toward it.

After the ducklings are three or four weeks old, they may be given as much freedom as old ducks. Unless natural food is very abundant, they should be fed some grain for a while. Ducks grown in this way cannot be sold to advantage as green ducks. At this stage of growth they cannot be collected from small flocks and marketed in condition to bring the prices paid for those from the special duck farms, and as it costs the farmer little or nothing to keep his ducks until mature, it is usually more profitable for him to do so than to sell them earlier.



FIG. 132. Duck farms at Speonk, Long Island

On a farm near a market where there is a good demand for green ducks it might pay very well to grow several hundred a year. On this scale the methods should be similar to those used on the special duck farms, except that the hatching might be done with hens. It would not do to let the ducks run about as recommended for stock which is to be kept until mature, because then they would not be fat at the age for killing them.

MARKET DUCK FARMS

History. The growing of ducks for the New York City market began on Long Island at a very early stage of specialization in poultry culture. Many farmers there produced a few hundred ducks for this market each year, and found it very

profitable. As the demand increased they tried to increase production to meet it, but were unable to do this, because there was then in this country no duck adapted to their needs. The Aylesbury Duck, the favorite table duck in England, was too delicate. The only hardy white duck that they had was the White Muscovy. This breed was not very satisfactory, because the females are much smaller than the males, but they had to use white ducks, for the colored ducks will not pick clean at the age at which ducks can be marketed most profitably; so they did the best

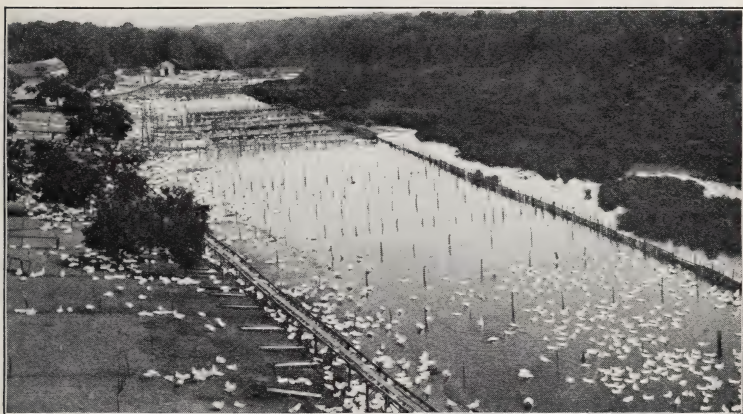


FIG. 133. View from the windmill tower in Fig. 132

they could with the White Muscovy Duck, under the restrictions placed upon their operations by the difficulty of getting broody hens. While the industry was mostly on Long Island, there were duck growers here and there on the mainland in the vicinity of New York and also near Boston, but there were no duck farms of any importance in other parts of the country.

When the White Pekin Ducks were brought from China, and reports of their hardiness, prolificacy, and rapid growth were circulated, the duck growers were at first very skeptical, but they soon learned that the reports which they had supposed were greatly exaggerated were literally true. Then every duck

grower had to have Pekin Ducks. The production increased very much after the introduction of the Pekin Duck, but the growth of the industry was still retarded by the impossibility of getting all the hens that were needed to hatch the eggs. Several incubators had been invented, which hatched very well for those who had the skill to operate them, but which, in the hands of unskilled operators, spoiled most of the eggs placed in them. About 1890 appeared the first incubators with automatic regulators that really worked so that the ordinary person could manage the machines successfully. One of the New England duck growers who had invented the best of the machines used before this time was already growing ducklings on quite a large scale. On Long Island, where most of the duck farms were located, the farmers were hard to convince of the superiority of incubators for their work. Indeed, the only way that they could be convinced was by practical demonstrations right on their own farms. The first incubators used there were machines set up on trial by a manufacturer who had invented an incubator which was very easy to operate. This man went to the duck growing district, placed machines on various farms, and went from farm to farm daily to attend to them, until the farmers were fully convinced that the machines would do what was claimed for them. In a very short time the artificial method had displaced hatching with hens on the commercial duck farms, and the business was growing amazingly. Within ten years there were many farms producing from 15,000 to 20,000 ducks a year, and a few producing from 40,000 to 50,000. One man on Long Island, who operated two farms a few miles apart, sometimes grew 80,000 ducks in a season. Those who were successful on a large scale became moderately rich. Without exception the successful duck farms have been built up from small beginnings by men who had very little capital to start with. Some of these farms have been operated on a large scale for twenty years.



FIG. 134. House and yards for breeding stock



FIG. 135. Brooder house for young ducklings



FIG. 136. Fattening sheds and yards

VIEWS OF WEBER BROTHERS' DUCK FARM, WRENTHAM,
MASSACHUSETTS

As would be expected, the success of the big duck farms has led many people with large capital to undertake to establish duck farms on a still larger scale. But these undertakings do not last long, because it is practically impossible to secure for such a plant an organization as efficient as one developed by the owner of a plant which has grown from small beginnings under his own management.

Description. A large duck farm is a very interesting place at any time, but is most interesting at the height of the growing season,



FIG. 137. Duck house and yards on seashore, Fishers Island, New York

when all the operations in the business are going on at the same time. The total number of birds on a farm at any time is very much less than the product for the season, because the first ducks hatched will have gone to market before the eggs which produce the last are laid, but in flocks of more than 10,000 the impression on the visitor is much the same, no matter what the numbers.

Duck farms are of two types: those located on streams or inlets have the yards for all but the smallest ducks partly in the water; the inland duck farms, on which the young ducks grown for market are given no water except for drinking. Some of the inland farms give the breeding stock access to streams and

ponds only during the molting season, when they can be allowed to run in large flocks and a small area of water will serve for all. For a time after the large inland duck farms were first established it was claimed by many that ducks grew faster when not allowed to swim than they did when allowed to follow their natural inclination to play in the water. No doubt some ducks which were in dry yards grew better than some having access to large bodies of water, and on the whole as good ducks were grown on the inland farms as on those near the water,



FIG. 138. Quarters for breeding stock on an inland duck farm. Swimming tanks in the yards

but it has long been known that it is much easier to manage the ducks when they have water in their yards. There are two reasons for this: in the first place, they are much more contented in the water; in the second place, they feel very much safer on the water when anything alarms them, and will keep quiet on it when, if they could not retreat to the water, they would rush about in a panic and many would be injured.

Ducks are very timid and easily panic-stricken. The duck grower has to take every possible precaution to guard against disturbances of this kind, because ducks are so easily injured, and even if they are not hurt, a sudden fright will make them

shrink a great deal in weight. Visitors who come merely out of curiosity are not desired on duck farms at any time, and none but those familiar with the handling of ducks are ever allowed to go about the farm without a guide who will see that the ducks are not disturbed. Many visitors think that this is unreasonable, but the duck grower knows that the mere presence of a stranger excites the ducks, and that a person walking about might put a flock in a panic which would at once extend to other flocks, simply because he was not familiar enough with the ways of ducks to detect the signs of panic in a flock which he was approaching, and to stand still until they were quiet, or move very slowly until he had passed them. If a stranger, walking between yards where there were five thousand ducks fattening, made an unconscious movement that set the ducks in motion, the loss to the grower could hardly be less than from five to ten dollars, and might be very much more. Where such little things can cause so much trouble and loss, the difference between success and failure may lie in preventing them.

On a duck plant with a capacity of 50,000 ducks everything is on a big scale. Although ducks will stand more crowding than other kinds of poultry, it takes a large farm for so many. The buildings will cover many thousands of square feet of land and, though of the cheapest substantial structure, will represent an investment of fifteen or twenty thousand dollars. Incubators, appliances, breeding stock, and supplies on hand will amount to about as much. The incubator cellar will be several times as large as the cellar under the ordinary dwelling house. Before the so-called mammoth incubators were made, the largest-sized machines heated with lamps were used on all duck farms, and an incubator cellar would sometimes contain as many as seventy incubators having a capacity of from 200 to 300 eggs each. Now many of the large farms use the mammoth incubators, with a capacity of from 6000 to 18,000 eggs each. These mammoth incubators are really series of small egg chambers so

arranged that the entire series is heated by pipes coming from a hot-water heater, instead of each chamber having an independent lamp heater as in the small, or individual, machines.



FIG. 139. Feeding young ducks on farm of W. R. Curtiss & Co., Ransomville, New York

As nearly all kinds of supplies are bought by the carload, and as stocks must be kept up so that there will be no possibility of running short of foodstuffs, a great deal of space is required

for storage. Large quantities of ice are needed to cool the dressed ducks before shipping them to market, so the farm must have its own ice houses and store its own supply of ice in the winter. For some years after duck farms grew to such large proportions, the mixing of mash was all done by hand, with shovels. Often one man was kept busy all day long mixing mash, and very hard work it was. Now the men on the large farms mix the food in big dough mixers, such as are used by bakers, and work that would take a man an hour is done in a few minutes.

In some sections the killing and dressing of the ducks is done by men with whom duck picking is a trade at which they work during its season. In others the killing is done by men, but the pickers are women living in the vicinity of the farm, who can be secured for this work whenever they are needed. A farm that markets 50,000 ducks in a season will keep a large force of pickers busy the greater part of the time for many months. Quite a large building is required to provide room for the pickers to work in, for tanks for cooling 500 or more ducks at once, for space for the men who pack them, and for lofts for drying the feathers before they are sold. This drying process must be used whether the birds are dry-picked or are scalded before the feathers are removed. Water on feathers dries quickly, but the oil in the quills dries very slowly. The feathers from one duck are worth only a few cents, and where small numbers are grown the feathers are hardly worth the trouble of saving and curing. On a large plant the total product of feathers for a season amounts to several thousand dollars, and it pays to provide facilities for taking proper care of them.

After the crop of ducks on an inland farm is marketed, the fences must be removed and the land plowed and sowed with winter rye. This crop is used extensively for this purpose, because it is a gross feeder and takes the impurities from the soil very fast, and also furnishes a good supply of green food for

the stock ducks during the winter and for the first young ducks put on the land in the spring. Where the farms are large enough, all ducks may be kept off a part of the land each year and crops grown on it. The farms located at the waterside do not have to look to the purification of the land so carefully, because the rains wash a great deal of the droppings away. Some of these farms get large quantities of river grass from the streams and cut it up to mix with the food for the ducks.

DUCK FANCIERS' METHODS

There are two general classes of duck fanciers: those who breed one or more of the useful varieties for fine form and feather points, and those who breed the ornamental varieties. Breeders of the latter class usually keep other kinds of ornamental poultry also.

The methods of the fanciers of useful kinds of ducks compare with those of the practical growers who handle small numbers as do those of the fowl fancier with the methods of the poultry keeper who keeps a few fowls for his own use. In a general way they are the same, yet wherever it is necessary they are modified to secure the best possible development of the type. If a duck fancier has not a natural water supply for his ducks, he either makes a small artificial pond or ditch or gives them water for bathing much oftener than the commercial duck grower thinks is necessary. He also gives both old and young ducks more room, and encourages them to take exercise, because this makes them stronger, more symmetrical, and better able to stand transportation and the handling to which they are subjected when taken to shows. Most duck fanciers are also fanciers of fowls or of some other kind of poultry. The competition in ducks is not nearly so keen as in fowls. Hence they are so much less interesting to a fancier that few are satisfied with the sport that may be obtained from exhibiting ducks only.

When the growing of green ducks for market began to be developed upon a large scale, many of those engaged in this line exhibited stock and sold birds for breeding and eggs for hatching. They soon found that while the Pekin Duck was unrivaled as a market duck, it was not of sufficient interest to fanciers to excite the competition that creates high prices for the finest specimens, and that it paid them better to devote themselves exclusively to the production of market ducks. At the present time only a few market duck growers make a business of selling breeding and exhibition stock. Most of them will not take small orders, but will fill large orders when they have a surplus of breeding stock and can get a good price for it. On almost every large commercial duck farm there are hundreds of birds much better than most of the Pekin Ducks seen at poultry shows, and many better than the best exhibited. There is probably no other kind of poultry in which so large a proportion of the finest specimens are found on the plants of those producing for market.

The ornamental varieties of ducks are given much less attention in America than they deserve. Few are seen except in large collections of fancy waterfowl, and sales from these collections are principally for special displays at shows. On many farms the Mallard, Call, and East Indian Ducks might be established and left to themselves, to increase in a natural way, only enough being sold or killed to keep them from becoming too numerous. If located in a suitable place, such a flock makes a very attractive feature on a farm. The highly ornamental Mandarin and Carolina Ducks, being able to fly quite as well as pigeons, must be kept in covered runs. They will breed and rear their young in a very small space. A covered run 6 ft. wide, 6 ft. high, and from 20 to 30 ft. long, built in a secluded place and having a small shelter at one end, makes a very satisfactory place for a pair of ducks of any of the small breeds to live and rear their young.

CHAPTER VIII

GEESE

People who are not familiar with animals often get wrong ideas of the characters of certain creatures from the popular metaphorical use of their names. Perhaps those who first applied these metaphors understood them correctly, but after long use by people acquainted with the metaphor but not familiar with the animal to which it relates, a part of the meaning is likely to be lost. This is what has happened to the term "goose" as applied to a person. When one acts stupidly foolish about some little thing he is often called a goose. Most people, associating the idea of stupidity with the name of the goose, suppose that geese are very stupid and uninteresting. If you will notice how the term "goose" is commonly applied to persons, you will discover that it is very rarely used except to apply to a person for whom the speaker has a great deal of affection. Under the same circumstances others are more likely to be designated by some harsher term. The most marked characteristic of a goose is not stupidity but an affectionate disposition. The ancient Egyptians noted this, and in their hieroglyphic writing a goose stood for "son." The goose is a very intelligent and interesting bird. It is of a most social nature and becomes very much attached not only to its mates but to other animals and to people. No domestic animal except the dog develops so much affection for its master as a goose will if it is permitted to do so. But, while interesting in some ways, the goose has so little of the other qualities which lead man to make a companion and pet of an animal, that its devotion is not usually encouraged. Commercially geese and ducks belong to the same class and are used in the

same way (the goose being preferred where size is desired), but in some points of character, structure, and habits they are quite different.

Description. In general appearance a goose resembles a duck so closely that people not familiar with both often mistake large white ducks for geese, but no one that knows either kind well is likely to make mistakes in the identity of any of the common



FIG. 140. Emden Geese

varieties. While many of the small domestic geese are no heavier than the largest ducks, geese are on the average more than twice as large as ducks. Their legs are longer and much stronger. Their bills are larger at the juncture with the head and smaller and more pointed at the tip. While ducks are

usually very timid, geese are bold, and this makes a marked difference in their attitude when approached and also in the carriage of their bodies. They are very strong birds, quite able to defend themselves against the attacks of small animals and from annoyance by children. Indeed, they are very likely to take an aggressive attitude toward persons or animals that they regard as trespassers, and a large gander when angry is a dangerous customer. A blow from his wing might knock a child down or even break a small child's arm.

There are no regular distinguishing marks of sex in geese. The males average larger than the females, but the difference is slight and some females may be larger than some males of the same breeding. In some foreign varieties, not known in this country, the males are mostly of one color and the females of another, but as there are exceptions to this rule, it is not reliable. In those varieties which have a knob on the bill this is likely to be more prominent in the males. There is nothing

in the form of the plumage to distinguish the male, like the little curl in the tail of the drake. The voices of males and females are so nearly alike that, while a difference may sometimes be noted in the voices of birds known to be of different sexes, the voice is not a plain indication of the sex. There are some males so dis-



FIG. 141. Toulouse Geese

tinctly masculine, and some females so distinctly feminine, in appearance and behavior, that a person familiar with geese will not often make a mistake in identifying the sex by the general appearance. There are others about which the most expert goose breeder is in doubt until the laying season arrives and the production or nonproduction of eggs shows without doubt which birds are females and which are males.

The name *goose* is applied to either male or female without reference to sex, and also to the female as distinguished from

the male. The male is called a *gander*. The young are called *goslings*. *Goose* and *gander* are the modern forms of Anglo-Saxon names.

Origin. Our fully domesticated geese all originated in the Old World. The European stock is believed to be derived from the Gray Lag Goose, which is still found in Europe in the wild state. The origin of the curious name "Gray Lag" has been the subject of much speculation. The most plausible theory is that which takes "lag" in its common meaning

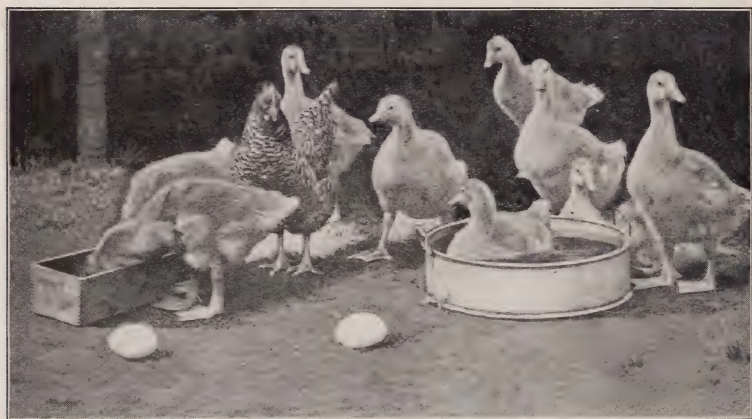


FIG. 142. Toulouse goslings three weeks old

and supposes that the term was applied to this species of goose because it was slower in motion, or because it lingered longer in Northern Europe, than the less familiar species. As in the wild state the Gray Lag Goose ranged over Europe and Northern Asia, it may have been domesticated many times in many different places. Wild specimens may still be brought into domestication, but there are no authentic reports of such cases. The Chinese breeds of geese, which will shortly be described, are quite different in appearance from the European races, but the difference does not necessarily show that they are of different origin.

Common geese. Throughout Europe and America the ordinary geese are of much the same type as their wild progenitor. They are a little heavier and coarser than the Gray Lag Goose, and have not its great power of flight, yet some of them can fly better than any other domestic poultry. The author has seen flocks of common geese fly from a high hill over the roofs of tall buildings at its foot and alight in a stream fully an eighth of a mile from where they started. It is perhaps needless to say that they always walked home. Such geese were hard-meated and tough except when quite young. They were geese that picked the most of their living where food was none too plenty. Well-kept stocks of common geese have probably always been very good table poultry.

Improved races. In various parts of Europe the common geese have somewhat distinctive race characteristics. The Roman Geese are supposed to be the oldest distinct race. They differ from ordinary geese in that the prevailing color is white, and they are more prolific layers. The Pomeranian Goose, found throughout Germany and Southeastern Europe, is somewhat larger. The female of this race is usually white, the male white with a gray back. Because of the peculiar markings of the male this variety is sometimes called the Saddleback Goose. The Emden and Toulouse Geese are very large. The Emden was developed in Germany, where it was at one time called the Brunswick Goose. The first specimens seen in America came from Bremen in 1826 and were called Bremen Geese. They had been known in England for a long time and had become very popular there under the name of "Emden Geese." The name "Bremen" was used in this country until about 1850, when the English name was adopted.

The Toulouse Goose is a very large gray goose which originated in a goose-growing district in the vicinity of Toulouse in the South of France. It was introduced into England about 1840 and into America about fifteen years later.

In Russia gander fighting was from very ancient times a popular sport, and several varieties of geese were bred especially for their fighting qualities. The most common of these is the Tula Goose, which is usually gray in color but is sometimes clay-colored. The latter point is very interesting for its bearing on the question of the common origin of the European and Asiatic



FIG. 143. White China Geese. (Photograph from Charles McClave, New London, Ohio)

breeds of geese, to be discussed in the next paragraph. None of the Russian races of geese are known in this country.

The Asiatic races of geese probably came to America as early as the Asiatic races of fowls. They were early known in England under a variety of names, and were quite popular there over a hundred years ago as Spanish Geese. A writer in an agricultural paper in 1848 stated that he had seen White China Geese in

Virginia in 1817. It appears, however, that the early introductions were immediately so mixed with the native geese that the distinct type was lost, and that it was not until nearly 1850 that the specimens were brought here from which the stocks now known were produced. There are two varieties of the China Goose—White and Brown. They are smaller and more graceful

than the improved European varieties and are more prolific layers than any except perhaps the Roman Goose. They have a large knob on the head at its juncture with the upper mandible. Most of the geese of Europe are either white or gray (black-and-white). The red which appears to a slight extent as brown in the Gray Lag Goose has



FIG. 144. Brown China Geese. (Photograph by E. J. Hall)

been lost or so reduced that it is not noticed except in the Tula Goose, which is sometimes clay-colored. The colored variety of the China Goose is distinctly brown. Hence, if they came from the same wild species as the European geese, the red which was reduced in Europe was greatly increased in China. But if, as is not impossible, they came from different wild species, a most interesting question arises: The Chinese types and the European types are perfectly fertile when bred together.

Would their wild ancestors (supposing them to have the same characteristics) be equally fertile? Unless we can find a wild ancestor for the Chinese type, all that we know of the relations of domestic races points to the conclusion that they, like the European races, are descended from the Gray Lag Goose.

The variety known as the African Goose is a larger and coarser type of the Brown China, and is probably obtained by crossing with the Toulouse or by selection from mixed flocks.



FIG. 145. African Geese on a Rhode Island farm

Nothing definite is known of the origin of this type, but to any one familiar with the stock in the goose-growing district of Rhode Island, and with the breeding methods of the farmers there as applied in the development of the Rhode Island Red fowl, it appears probable that African Geese came from this district.

Ornamental varieties. There are two ornamental varieties of domestic geese and quite a number of species of wild geese that are kept in collections of fancy waterfowl. The Sebastopol Goose evidently belongs to the common domestic species. It is

about the size of the common goose, is white in color, and has a peculiar development of some of the feathers of the body and wings, this development of the plumage giving the variety its ornamental character. A number of feathers on the back of this bird are long and twisted, as if they had been loosely curled, and lie in a wavy mass on the back and rump. The Egyptian Goose is the smallest domestic goose. It is unlike other domestic geese



FIG. 146. Sebastopol Geese on an English farm

in being quite gaudy in color. It is found in the wild state and also in domestication in many parts of Africa. Sebastopol and Egyptian Geese are rare in this country.

The Canada Goose, or American Wild Goose. Few persons in America have not at some time seen a flock of wild geese flying in wedgelike formation as they migrate in the spring and fall. Their honking can often be heard when they cannot be seen. Hunters watch for these flocks and, when they are flying low,

sometimes shoot them as they pass, but the favorite method of hunting wild geese is to induce them to approach a hunter concealed where he can get a better shot at them. For this kind of hunting, shooting stands are built near bodies of water where wild geese may alight in their passage. These stands are either concealed in the bushes or masked by green boughs. In order to bring near the stands any wild geese that may alight of their own accord, and also to attract any flying by, captive wild geese



FIG. 147. A pet Canada gander. (Photograph from George E. Parrett)

are used as decoys. At first the birds used for this purpose were those crippled but not killed by the hunters and kept in confinement. As the supply secured in this way was small, and as the wild birds bred readily in captivity, the breeding of wild geese for decoys soon became quite common in districts where the shooting of this kind of game was good. The wild geese will mate with domestic geese, producing a sterile hybrid called a mongrel goose.

Place of geese in domestication. In ancient Egypt and Rome the goose was a sacred bird, not an object of worship but reserved for the use of the priests, who keenly appreciated the advantage of having a monopoly of the use of the best domestic table bird then in existence. In later times, until the turkey was introduced, goose was the favorite kind of poultry for festal occasions all through Europe. Then it lost some of its popularity in those places where turkeys were extensively grown. In

Germany, Austria, and Russia there is still a very large production of geese. In this country geese are grown in small numbers by a few persons in almost every community. The feeding and flocking habits of geese especially adapted them to the conditions under which they were kept when stock of all kinds was allowed to run at large and to feed on common or unoccupied land in charge of a gooseherd. As towns grew, and as people became less tolerant of the trespassing of live stock, the growing of geese

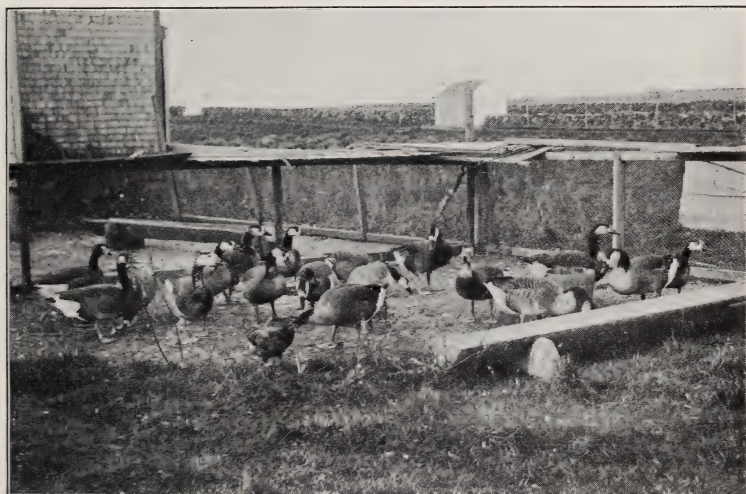


FIG. 148. Mongrel Geese on a Rhode Island farm

in towns declined. Nearly all the geese now produced in this country come from flocks on general farms. The production of geese on farms has been restricted to some extent by the abundance and cheapness of turkeys. As turkeys become scarce and dear in any locality the production of geese seems to increase. From early times geese have been prized for their feathers. So valuable have these been considered that it has been a practice to pluck the live geese each year before they molted. Public opinion now condemns this barbarous practice, and persons plucking live geese are sometimes punished for cruelty to animals.

CHAPTER IX

MANAGEMENT OF GEESSE

Geese will bear confinement well if given proper attention, but they require such large quantities of succulent green food that it does not pay to grow them where they cannot secure most of this by foraging. Very few people who keep geese in inclosures too small to furnish them with good pasture can conveniently supply them with all the green food that they need. Hence no one engages in growing geese in close quarters for profit. Many, however, grow a few geese under such conditions because of the interest a small flock affords. Goose growing cannot be developed on intensive lines as duck growing has been. One obstacle to this is the difficulty of supplying green food under such conditions. Another is that the average egg production is small. The description of the management of geese on farms will show more fully why this branch of poultry culture is likely always to be restricted to general farms.

SMALL FARM FLOCKS

Size of flock. On the ordinary farm, where only a few dozen geese are grown each year, a flock of one male and from two to four females gives a sufficient number of breeding birds. It is more difficult to get a start with geese than with fowls or ducks, because a young gander will often mate with only one goose, and an old gander separated from mates to which he has become attached may be very slow about establishing new family relations. An experienced goose grower does not expect to get very good results the first season that a flock of breeding birds are

together. On the other hand, a flock once harmoniously mated does not have to be renewed every year or two. As long as the old birds are vigorous the entire product of young may be sold each season without reducing the producing capacity of the flock. The average gander is past his prime after he is six or seven years old, but geese are often good breeders until ten or twelve years old. Occasionally a goose lives to a great age. There are reliable accounts of geese breeding well when over twenty years old. Some stories of geese living to more than eighty years of age have been widely circulated, but little credence is to be given such tales ; people who originate them and suppose that they are true do not know how difficult it would be to make sure of the identity of a goose through so long a period.

Houses and yards. Geese, like ducks, prefer to live in the open air, and do not often voluntarily take shelter from any element but heat. It is customary to provide a small shelter which they may use if they wish. In most cases it is not necessary for a farmer to make a yard especially for geese. The permanent fences or walls between the divisions of the farm will usually keep geese in the pasture allotted to them. The best place for geese is a marshy meadow in which some parts of the surface are elevated enough to be quite dry at all seasons. These places afford more comfortable resting places when the birds tire of the wet land. They also furnish different kinds of grass from those growing on very wet land. On many farms there are tracts of land much more suitable for geese than for any other live stock. Cattle and hogs sometimes cut up such land very badly, destroying the vegetation on it and making it unsightly. Such a piece of land is sometimes a part of a pasture used for cattle. In that case it may be a good plan to fence the cattle from the soft ground with a wire or rail fence, which keeps them out of the part reserved for the geese, yet allows the geese the range of the whole pasture. A small number of geese in a large pasture will not hurt the pasture for cattle or horses.

Too many geese in a pasture spoil the grass for themselves as well as for other stock. Even when cattle have access to all parts of a pasture in which there are geese, a small space should be inclosed for a feeding pen, where food for the geese will be out of the reach of other stock. This is especially necessary during the breeding season, when they usually require extra food.

Feeding. A flock of geese in a good pasture need no other food except at the breeding season or when they are being fattened. If there is any doubt about the pasturage being sufficient, a small trough or box containing grain of any kind that it is convenient to give them should be put where they can eat what they want. When there is snow on the ground, they should have a little grain and all the cabbage, beets, turnips, or other vegetables they want.

Laying season and habits. Geese usually begin to lay in February or March. As many nests should be provided as there are geese, for while two or more geese sometimes lay peaceably in the same nest, it is more likely that each goose will want one to herself. A barrel placed on its side in a secluded place makes a good nest. Geese are sometimes very notional about the location of the nest and, neglecting one provided for them, may choose a spot right out in the open or in some place where the nest is not well protected. When they do this, it is a good plan to place over the nest, without disturbing it, a large box with a hole cut in one end for passage. Geese, like ducks, lay very early in the morning. When they begin laying while the weather is cold, the person who has charge of them must be up early and get the eggs before they are chilled. A goose usually lays from twelve to eighteen or twenty eggs and then goes broody. The common practice is to set the first lot of eggs under hens, and keep the goose away from her nest until she shows no inclination to sit. She may then be allowed access to the nest and before long will begin laying again. As a rule the second lot of eggs will be fewer in number than the first. When the goose

goes broody the second time, it is as well to set her, for if stopped again she may not resume laying. Occasionally a goose lays for a whole season without going broody.

Hatching and rearing goslings. In hatching goose eggs under hens the hens are managed in just the same way as if they had hen eggs. Each hen is given four or five eggs, according to the size of the eggs and the size of the hen. A goose must be set in the nest where she has been laying. If she is inclined to be very cross if approached while sitting, she should be left to herself as much as possible, care being taken that nothing can molest her. With the help of the gander a goose can defend her nest against almost anything likely to attack it, but some eggs would probably be broken in the fray.

The period of incubation is from thirty to thirty-five days. The goslings sometimes chip the eggs two days before completing the process. They should be left in the nest until they begin to run about. Then, if they are with a goose mother, they may safely be left to the care of the old ones, and may not even need to be fed. The early goslings with hen mothers should be placed on sod ground where the grass is fine and soft, in coops such as are used for little chickens, with a small pen in front of each coop to keep them from wandering away. This pen may be made of boards 8 or 10 inches wide, set on edge and kept in place by small sticks driven into the ground. It is best to give them only grass to eat the first day. After that two or three light feeds of mash may be given daily, but they should always have all the fresh, succulent green food that they can eat. The coops and pens should be moved as often as is necessary to secure this end. The goslings should also be constantly supplied with drinking water. They will appreciate a bath occasionally.

Goslings grow very rapidly. In from ten to fourteen days they are so large that they no longer need the hen mother and she may be taken away. At this stage several broods may be

combined and the flock allowed the run of any place where it can graze unmolested. A shelter should be provided for protection from the sun, and a roomy coop with a dry floor to keep them in at night. If allowed to do so, they would stay out and graze at intervals during the night, but the owner will sleep more comfortably if he is sure that nothing can disturb them. Although very big babies, they are quite soft and helpless at this stage. When



FIG. 149. Goslings three or four days old

six weeks old a gosling is nearly half-grown. Young goslings that were started with hen mothers may then be put into the pasture with the old geese. When ten or twelve weeks old they will be almost as large as the adult birds.

In growing geese on the farm the most important thing is to provide good pasture. Grass



FIG. 150. Goslings three weeks old

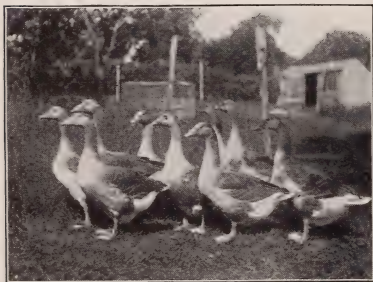


FIG. 151. Goslings nine weeks old

is not only the most economical food, but it is the best food. Geese will grow and fatten on grass without grain, but will not fatten as quickly or be as firm-fleshed. To fatten for market they should be confined for from ten to twenty days before they are to be killed, and fed all that they will eat of some very fattening food. Corn soaked in water until it is soft is an easily prepared food and a very good one.

LARGE FLOCKS OF GEESE ON FARMS

The most important goose-growing district in the United States is that part of Rhode Island where the colony system of egg farming is used. This district is well adapted to goose growing. The winters are not severe, and the birds can have grass almost the year round. The breeding geese are often kept in pastures occupied by hens and cattle, but there are also many small ponds and marshy places used exclusively for geese. The absence of foxes makes it possible to keep them in fields a long way from the farmhouses, and for this reason many spots are used for geese which in other districts would be too exposed. The large flocks of hens in this district give an abundance of sitters to hatch the early goslings. As the person who looks after the sitting hens and the young chickens on one of these farms has to give the greater part of his time to that work for several months in the spring, he can often use the remaining time to best advantage by hatching and rearing a few hundred goslings. So a large proportion of the farms which specialize in eggs also specialize in geese.

The numbers grown on a farm vary from 100 to 500, the average being between 200 and 300. To produce this average number, flocks of 15 or 20 geese and 4 or 5 ganders are kept. A flock of this kind does not mate miscellaneously, as a similar flock of ducks would. It is composed of as many families as there are ganders, and if the pasture is large, these families will remain separate a great deal of the time.

The method of handling the geese on these farms differs from the ordinary farm method in that the work is done more systematically and more attention is given to the goslings while growing. They are grazed each year on new grassland. Most of them are sold unfatted, as soon as they are of full size, to men who make a business of fattening and dressing them.

GOOSE-FATTENING FARMS

Market duck growing is conducted on so large a scale that each grower can employ expert pickers and sell his product directly to wholesale dealers in poultry. So the duck grower fattens his own ducks before killing them. It is natural for him to do this, too, because his method of fattening is a modification of the feeding process which he has used from the start. As he



FIG. 152. Goslings grazing on a Rhode Island farm

nears the end of his process of feeding, he simply increases the proportion of fat-forming material in the food and feeds all that the ducks will eat. The fattening of geese that have been grown on grass to make them of the quality that will bring the highest price requires a change to a heavy grain diet. The farmers who grow these geese could fatten them better than any one else and make more profit on them, but few of these farmers are willing to give them the special attention that this requires. So large a part of the geese sold alive are thin that the men who bought them to dress for market long ago saw an opportunity to make

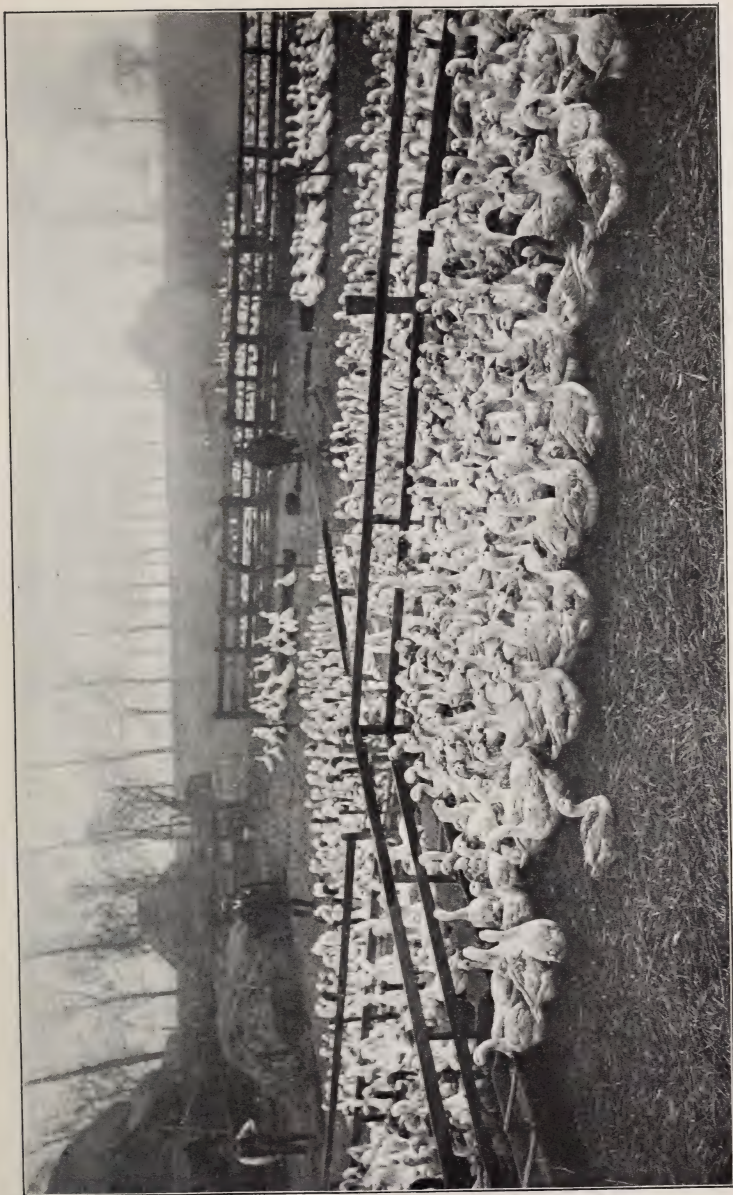


FIG. 153. Scene on a goose-fattening farm in England

a greater profit by fattening them before they were killed. Some of those who engaged in fattening geese were very successful and made large profits. As they extended operations in this line they required a great deal of land. Sometimes as many as 15,000 geese are fattened on one farm in a season. The fatteners buy in the early part of the summer from the farmers who sell the green geese as soon as they are grown. As these make the finest geese for the table, and as the best demand for geese comes at the holiday season in the winter, a large part of them are put in storage after being killed. After the green geese are disposed of, the fatteners buy live geese shipped in from distant points, and have them ready to kill about the time when the demand for goose is good.

While they are very profitable when everything goes well, fattening geese is a business attended by heavy risks. In buying from many different sources a fatterer may get some geese having a contagious disease, and the infection may spread through his whole flock before he discovers it, for some diseases have no pronounced symptoms in their early stages. Keeping such large numbers of geese on the same land year after year also brings trouble through the pollution of the soil.

GROWING THOROUGHbred GEESSE FOR EXHIBITION

The proportion of thoroughbred geese among those grown for market is very small. Most of the geese on farms are grades produced by crossing thoroughbred or high-grade males on the old unimproved stock. This gives a type of goose which is much better than the old common goose but not nearly as large as the heavy Emden and Toulouse Geese. The intermediate size is, however, large enough to meet the general market demand. The production of thoroughbred geese is carried on to supply stock of medium quality for the farmers who want to maintain a good grade of stock, and to supply exhibition birds of the

best quality for the relatively small numbers of fanciers and breeders of standard-bred stock. The usual method of growing exhibition geese is to keep only one breed on a farm, and to manage them as ordinary geese are managed, except that, to secure the best possible development, the breeder is more careful than the average farmer is to provide abundant pasture and all the grain that the birds can use to advantage. Occasionally several breeds of geese are kept on a farm, but most breeders consider one enough.

GROWING A FEW GEESE ON A TOWN LOT

Old geese are so noisy that they are undesirable inhabitants for populous places. In such a place a poultry keeper who wants to grow a few geese often finds it satisfactory to buy eggs for hatching and either dispose of the goslings as green geese when three months old or eat one as he wants it until all are gone. The only difference in handling goslings in close quarters and on farms is in the method of providing the green food. On the farms the birds graze; on the town lot they must be fed very abundantly with succulent food. They will eat almost any vegetable leaf that is young and not too tough, and they should have such food almost constantly before them. Most people who try to grow geese in a small space injure them by feeding too much grain. If they have had no experience in this line, they suppose, quite naturally, that birds so much alike as the goose and the duck, both in outward appearance and in the texture and flavor of the flesh, require the same diet. When we compare the duck, which lives so largely on grain and meat, with the goose, which makes greater growth in the same period on grass alone, we can begin to appreciate what large quantities of bulky green food the goose needs to accomplish so remarkable a result.

While the growing of geese in bare yards is not recommended as a paying venture, every one interested in poultry should grow a few occasionally for observation.

GROWING WILD GEESE IN CAPTIVITY

Wild geese mate in pairs. If they are to be bred successfully in captivity, they must have a place away from other animals, where they will not be disturbed. They will be more contented if located near a small pool or stream. A pair of wild geese is usually kept during the breeding season in a small, isolated inclosure containing a permanent water supply. Here the female will make her nest, lay her eggs, and hatch her brood. The male at this period is very savage and will vigorously resent any interference with his mate. Most wild geese in captivity lay but a few eggs, and the broods hatched are small. There are seldom more than five or six goslings in a brood. After the young are hatched, the parents may be allowed to leave the inclosure with them.

CHAPTER X

TURKEYS

The turkey is commonly considered the best of birds for the table, the most desirable for any festive occasion, and quite indispensable on Thanksgiving Day. It is the largest bird grown for its flesh. As usually found in the markets, geese and turkeys are of about the same weight, because most people, when buying a large bird for the table, want those that, when dressed, weigh about ten or twelve pounds ; but the largest turkeys are considerably heavier than the largest geese, and the proportion of extra large birds is much greater among turkeys.

Description. A dressed turkey and a dressed fowl are quite strikingly alike in shape. The most noticeable difference is in the breast, which is usually deeper and fuller in a turkey. The living birds are distinctly unlike in appearance, the carriage of the body and the character and expression of the head of the turkey being very different from those of the fowl. The head and upper part of the neck are bare, with a few bristly hairs. The bare skin is a little loose on the head and very much looser on the neck, forming many small folds, some of which are sac-like. It varies in color from a livid bluish-gray to brilliant scarlet. An elongated, trunklike extension of the skin at the juncture of the beak with the head takes the place of the comb in the fowl. There is a single wattle under the throat, not pendent from the jaw, as in the fowl, but attached to the skin of the neck. The feathers on the lower part of the neck are short, and the plumage of the whole body is closer and harder than that of most fowls. The wings are large. The tail spreads vertically and is usually carried in a drooping position. This, with the shortness

of the feathers of the neck, makes the back of the turkey convex. The usual gait of the bird is a very deliberate walk.

The male and female differ conspicuously in so many points that the sex of an adult bird is distinguished without difficulty. As a rule the males are much larger than the females of the same stock. In colored varieties the males are more strongly pigmented, and the shades of color in them are more pronounced. The head characters of the male are much more prominent in size and more brilliant in color. Both sexes have the power of inflating the loose appendages of the head and neck. In the male this is highly developed ; in the female only perceptible. The male has a brushlike tuft of coarse hair growing from the upper part of the breast. This tuft, called the beard, is black in all varieties. The female is usually shy and has a low, plaintive call. The male challenges attention and often struts about with his tail elevated and spread in a circle like a fan, wings trailing on the ground, the feathers all over the body erected until he looks twice his natural size, and at frequent intervals vociferously uttering his peculiar "gobble-gobble-gobble." The male turkey has short spurs like those of the male fowl.

The name *turkey* was erroneously given in England when the birds were first known there and it was supposed that they came from Turkey. The adult male is called a *turkey cock*, also a *tom-turkey* (sometimes simply *tom*) and a *gobbler*. The adult female is called a *turkey hen*, or a *hen turkey*, the order of the terms being immaterial. Young turkeys before the sex can be distinguished are variously called *young turkeys*, *turkey chicks*, and *poults*, the latter being considered by poultrymen the proper technical name. After the sex can be distinguished, the terms *cockerel* and *pullet* are applied to turkeys in the same way as to fowls.

Origin. The turkey is a native of North America. Although not as widely distributed as before the country was settled, it is

still found wild in many places. It was domesticated in Mexico and Central America long before the discovery of the New World. Domesticated stock from these places was taken to Spain and England early in the sixteenth century, and was soon spread all over Europe. The domestic stock of the colonists in the United States and Canada came from Europe with the other kinds of domestic poultry. It is probable that from early colonial times the domestic stock was occasionally crossed by wild stock, but



FIG. 154. Common turkeys on a New England farm

we have no information about such crosses until after the Revolutionary War. From the earliest published statements in regard to the matter it would appear that such crosses had long been common, and that the benefits of vigorous wild blood were appreciated by the farmers of that time. The wild turkey is about as large as a medium-sized domestic turkey but, being very close-feathered, looks smaller. It is nearly black, and the bare head and neck are darker in color than in most domestic birds.

Common turkeys. The turkey is not so well adapted to domestication as the fowl, duck, and goose. Under the conditions to which they have usually been subjected domestic turkeys have

lost much of the vigor of the wild stock. As far as is known, the birds taken to Europe after the discovery of America were black or nearly black. In Europe white sports appeared and were preserved, and the colors became mixed — black, white, gray of various shades, brown, and buff. That has been the character of most flocks in this country until quite recent times, and many such flocks are still found.

Improved varieties. The development of the domestic turkey is unique in that the most marked improvement in domestic stocks has been due to extensive introductions of the blood of the wild race. The reason for this is indicated in the statement in the preceding paragraph, in regard to the lack of adaptation of the turkey to the ordinary conditions of life in domestication. The turkey deteriorates where the other kinds of poultry mentioned would improve. So, while in Europe a few color varieties were made, and in some localities both there and in America local breeds of special merit arose, on the whole the domestic stocks were degenerate. The distinct color varieties were the Black, the White, and the Gray, but by no means all turkeys of these colors were well-bred birds. The color varieties were crudely made by the preference of breeders in a certain locality for a particular color. They were impure and often produced specimens of other colors because of the occasional use of breeding birds unlike the flock. In early times it was the almost universal opinion that crossbred stock had more vitality than pure-bred stock. Hence farmers, although preferring a certain type of animal, would often make an outcross to an entirely different type, and then by selection go back to the type of their preference. When this mode of breeding is adopted, undesirable colors may appear for many years after a bird of a foreign variety has been used in breeding.

The local European breeds that gained a wide reputation were the Black Norfolk, the Cambridgeshire Bronze, and the White Holland. Black and White turkeys were perhaps quite

as popular and as well established in other places as in those mentioned. Black turkeys were the most common kind in Spain and in some parts of France. In some other parts of France, and in parts of Germany and Austria, White turkeys were the most numerous, but in general the turkeys of Europe and America were of various colors, with gray predominating.

In the United States a local breed of very good quality was developed in Rhode Island about the middle of the last century. It appears to have been known at first as the Point Judith Bronze Turkey, and also as the Narragansett Turkey, but the first name was soon dropped and has long been forgotten by all but those familiar with the early literature. The Narragansett Turkey was not bronze as the term is now applied to turkeys ; it was a dark, brownish-gray, which is doubtless the reason why the name was changed after the distinctly bronze turkeys became well known. Although the Narragansett Turkey is described in the American Standard, and prizes are still offered for it at some shows, the type has almost disappeared.

Bronze turkeys. The accidental crossing of wild with tame turkeys produced, in the domestic flocks where such crosses occurred, many specimens of exceptional size and vigor, in which the blending of the colors of the wild turkey with the gray of the domestic birds gave rise to a very beautiful type of coloration. It was neither black nor brown nor gray, but contained all these shades and had an iridescent bronze sheen. As the crosses which produced these were only occasional, the wild blood being reduced in each generation removed from it, the bronze type was usually soon merged with and lost in the common type. As the wild birds became scarce, crosses were rare, and what improvement had been accidentally made was in danger of being lost, when the awakening of interest in all kinds of poultry stirred turkey growers to more systematic efforts for the improvement of domestic stock by crossing with the wild stock. Those who were able to do so captured wild birds and bred

them in captivity, producing both pure wild and half-wild stock. They also secured the eggs of wild birds and hatched and reared the young with tame hens. With wild stock under control, they were able to use as much wild blood as they desired in their



FIG. 155. White Holland Turkey cock. (Photograph by E. J. Hall)

flocks, and soon fixed and improved the bronze type until they had a variety of turkeys that were extremely hardy, larger than the wild race or any domestic stock that had hitherto been produced, and also more attractive in color. The name "Bronze" was soon applied exclusively to this type of turkey in America. In England they are called American Bronze, to distinguish them from the Cambridge Bronze, which

seems to be very nearly a duplicate of the Narragansett.

The evolution of the Bronze Turkey in America is one of the most interesting things in poultry culture. The work was done on a very large scale. It was not just a few breeders that engaged in grading up domestic turkeys with wild blood,

but a great many scattered all over the country. Many, remote from places where wild turkeys ranged, paid high prices for full-blooded wild males, and also for grades with a large proportion of wild blood. In this way the wild blood was very widely distributed. As the superiority of the bronze type became established, turkey growers everywhere bought Bronze males to head their flocks, and so in a remarkably short time



FIG. 156. Flock of White Holland Turkeys

Bronze Turkeys of a type much superior to the old domestic stock became the common turkeys in many districts.

Interest in the American Bronze Turkey arose in England at a very early stage of this development. In fact, there is some reason to believe that the publicity given to several early shipments of small lots of wild turkeys to France and England did more than anything else to direct the attention of breeders in this country to the value of systematic breeding to fix the characters which wild blood introduced. The most celebrated

of these shipments was one taken to France by Lafayette on his return from his last visit to the United States in 1825. About this time, or earlier, an English nobleman, who had



FIG. 157. Bronze Turkey cock. (Photograph by E. J. Hall)

some American wild turkeys, presented his sovereign with a very fine horse. The king, instead of expressing pleasure with the gift, intimated that he would prefer some of the wild turkeys,

and was accordingly presented with a pair. The use of wild blood to give greater vigor to domestic stock continues, though it gives no better results now than the use of vigorous Bronze Turkeys many generations removed from wild ancestry.

Influence of the Bronze Turkey on other varieties. Although White turkeys have long been very popular in some parts of Europe, in this country they were, until recently, considered too weak to be desirable for any but those who kept them as a hobby. By chance mixtures of Bronze and White turkeys, and in some instances by systematic breeding, white turkeys that were large and vigorous were produced. Some of these were large enough to be called mammoths, as the largest Bronze Turkeys were. A few breeders who had these big white turkeys advertised them as Mammoth White Turkeys produced by Mammoth Bronze Turkeys as sports and in no way related to the old, weakly white birds. But whatever may have been the case at the outset, in a few years the Mammoth Whites were so mixed with others that the distinction was lost, for the best buyers of superior white turkeys were those who liked the color and had inferior stock which they wished to improve. All white turkeys in America now go by the old name, "White Holland Turkeys."

Yellow or buff turkeys were often seen among the old common turkeys. They were usually small and very poor in color. The mixture of bronze turkeys with these birds occasionally produced larger birds of a darker, more reddish buff but very uneven in color, with the tail and wings nearly white. From such birds, by careful breeding, a dark red race with white wings and tail was made. This variety is called the Bourbon Red, from Bourbon County, Kentucky, where it originated.

Other varieties of the turkey. The only other variety worthy of mention here is the Slate Turkey. Birds of this color are often seen in mixed flocks. Some of very good size and color have been bred for exhibition, and the Slate Turkey in America is classed as a distinct variety.

Place of the turkey in domestication. In discussing the history of the turkey in domestication much has been said of the influence of conditions on the type and on the vitality of this bird. The case of the turkey is peculiar, because it seems as capable of being tamed as the fowl, the goose, or the duck, yet does not thrive under the conditions in which it would grow tame. It is peculiarly sensitive to the effects of soil which has



FIG. 158. Bourbon Red Turkeys. (Photograph from owner, C. W. Jones, Holmdel, New Jersey)

been contaminated by the excrement of animals, and so instinctively avoids feeding places on which other animals are numerous. Thus it requires a large range and, if permitted to follow its inclination, spends most of its time at a distance from the homestead. The successful growing of turkeys depends upon the watchfulness of the caretaker and the absence of their natural enemies. This will appear more clearly when the methods of managing them are described in the next chapter. Turkey culture is not well adapted to the more intensive methods of farming which become

necessary after the first fertility of the land has been exhausted. Hence the turkey has almost disappeared from many places where turkey growing was once an industry of considerable importance. The farms of the Central West and the mountain regions of Virginia, West Virginia, Kentucky, and Tennessee have for many years produced most of the turkeys consumed in this country, but the changing conditions in these regions seem unfavorable to the increase of turkey culture. Attempts to grow turkeys on a large scale have been made on the Pacific coast. While these may succeed for a time, turkey culture in this country is likely to decline rapidly unless changes in economic conditions afford cheaper labor on farms, or unless the natural enemies of poultry are so reduced that flocks of turkeys may be kept in a half-wild state.

CHAPTER XI

MANAGEMENT OF TURKEYS

The turkey is almost exclusively a farm product. It is possible to grow a few good turkeys in confinement, but this is rarely done except in experimental work or by persons who grow a few for amusement and for an opportunity to study some of their characteristics. A few adult turkeys may be kept on a small farm and remain about the homestead as other poultry does. The turkeys themselves may get along very well, but they are likely to abuse the fowls, and as they can easily fly over any ordinary fence, they cannot be controlled except by putting them in covered yards. Turkeys kept under such conditions cause so much trouble that, after the novelty of watching them has worn off, the owner soon disposes of them. It is where the farms are large and there is a great deal of woodland and pasture through which the turkeys may roam without strict regard to farm boundaries, and large grain and grass fields where they can forage after the crops are removed, that turkeys in large numbers are grown for market with good profit. On such farms, too, the farmer, if he is a good breeder, can produce the finest exhibition specimens.

Size of flocks. The number of turkeys kept on a farm for breeding usually depends upon the number of young it is desired to rear, but the difficulty of keeping more than one adult male with the flock tends to restrict the annual production to what can be reared from one male. Experience has taught that it is not advisable to have more than ten or twelve females with one male. Sometimes a much larger number is kept with one gobbler, and the eggs hatch well and produce thrifty poults; oftener an excess of females is responsible for poor results which the breeder

attributes to other causes. The average hen turkey lays only eighteen or twenty eggs in the spring. Some hens lay even less. Once in a long time a turkey hen lays continuously for many months. A turkey grower who raises eight or ten turkeys for each hen in his breeding flock does very well. To do much better than this the hatches must be exceptionally good and the losses very light. Those who grow turkeys for profit expect them to pick the most of their living from the time they are a few weeks old until they are ready to fatten for market. A grower will, therefore, rarely undertake to hatch more young turkeys than he thinks can find food on the available range. It takes a very large farm to provide food for a hundred young turkeys and the old birds which produced them, after the young ones are well started. On many large farms where turkeys are grown regularly, not more than seventy or eighty are ever hatched, and if losses are heavy, not more than two or three dozen may be reared. A farmer who grows from seventy to a hundred turkeys is in the business on a relatively large scale. Flocks of larger size are sometimes seen in the fall, but not very often. The ordinary farm flock of breeding turkeys rarely has less than three or four or more than ten or twelve hens.

Shelters and yards. The wild turkey living in the woods, with only such shelter from the rigors of Northern winters as the trees afford, is perfectly hardy. Domestic turkeys are most thrifty when they roost high in the open air yet are not fully exposed to storms and cold winds. If left to themselves they usually select convenient trees near the farm buildings, or mount to the ridge of a shed or a barn, or perch on a high fence. A high perch to which they can mount by a succession of easy flights has such an attraction for them that it is a common practice to place strong perches between trees that are near together, or on tall, stout poles set for the purpose, where other trees or buildings form a windbreak. The turkeys, if at home, will not fail to go to such a roost as night approaches. One of the

most important tasks of the person who has charge of a flock of turkeys is to see that the flock is at home before nightfall.

After they begin to roost, young turkeys need no shelter in the spring and summer. When chilly nights come in the fall, late-hatched turkeys may do better housed than in the open. Turkeys that are well grown and fully feathered do not need to be under cover in the winter except in protracted or very severe storms. Turkey growers who wish to have the birds partially



FIG. 159. House and yards for stock turkeys on a California ranch. (Photograph from the Bureau of Animal Industry, United States Department of Agriculture)

under control, and want to be able to catch any one when they need it, often have the birds roost in a shed or other outbuilding available for the purpose. Such places should be very well ventilated, or the turkeys will become soft and take colds.

Yards are made for turkeys only to enable the person in charge of them to keep them under control when necessary. The principal uses of the yards are to confine the hens at the laying season and to separate birds from the general flock when there is any occasion for this. A great deal of trouble is sometimes saved by having a small yard for such purposes. The

height of fence required depends on the size and weight of the turkeys and also upon whether they are in the habit of flying. A turkey that is not accustomed to fly may not attempt to go over a fence four or five feet high that has no top upon which it could alight. The same bird, when confined in a strange place, might, without hesitation, fly to a roof twice as high, because, although not in the habit of flying, it has the power to fly such a distance and can see that the roof offers a suitable place for alighting. A turkey in the habit of flying over obstacles will often go over a fence six or seven feet high without touching. A turkey hen that is laying will not fly as freely as one that is not, because the weight and bulk of the eggs in her body encumber her movements. For this reason a five-foot fence is usually high enough for a yard for breeding stock, if they are to be confined to it only as much as is necessary in order to make sure that the hens will lay at home.

Feeding. The natural diet of the turkey, like that of all birds of the order of *Scratchers*, consists of a variety of vegetable and animal foods. Turkeys eat the same things that fowls eat, and apparently in about the same proportions, but their foraging habits are quite different. The disposition of the fowl is to dig for its food wherever it appears that anything is to be had by scratching. The turkey will scratch a little, but it prefers to wander over the land, picking up the food that is in sight. Fowls will forage from their house to the limits of their usual range and return many times in the course of a day. A flock of turkeys, if allowed to do so, leaves its roosting place in the morning and makes a wide circuit, often returning home in the afternoon from a direction nearly opposite to the direction they took in the morning. On their circuit, which is likely to follow the same course day after day, turkeys have their favorite feeding and resting places. Persons familiar with the route of a flock can tell where they are likely to be found at any hour of the day. If food becomes scarce on their circuit, the

turkeys extend it, or go on an exploring expedition which takes them a long way from home. If night overtakes them at a distance from home, they look for a convenient roosting place and remain there.

The feeding habits of the turkey make it especially valuable for destroying grasshoppers and other insects that damage field crops. To get an adequate idea of the great quantities of insects



FIG. 160. Turkey roost in shelter of barn on a Rhode Island farm

destroyed by a flock of turkeys, and of the waste food that they save and turn to profit by eating it, one should take careful note of the amount of food consumed when the turkeys are fed all that they can eat at one time (as when they are being fattened), and from this compute the amount that a flock must pick in order to live, as many flocks do, from spring until fall almost wholly upon what they get by foraging. Turkeys are much more systematic foragers than fowls, working more in concert. A flock advances in an irregular yet orderly

formation, taking all the choice food in its way, but not often tempted to side excursions which would disperse the flock.

Many people who keep turkeys make a practice of feeding a little grain, usually corn, in the evening as an inducement to them to come home. When they require more food, they may be given whatever is fed to the fowls. Indeed, unless some arrangement is made by which the fowls and turkeys are fed separately, the turkeys may get the habit of being on hand when the fowls are fed, and drive them from the food. This, however, is most likely to happen when the range for the turkeys is so restricted that it does not afford good picking.

Breeding season and laying habits. Experienced growers of turkeys like to get their young turkeys hatched about the time when settled weather may be expected in the spring. Little turkeys are less rugged than little chickens, and are very sensitive to cold, damp weather. Although the hens may have been very domestic all winter, when they begin to lay they develop more of a roving disposition than is at all satisfactory to their keeper. They are very likely to want to hide their nests. When this is the case, and there is no yard in which they may be confined, they make a great deal of trouble. They often go a long way from home to find places for their nests, and make such wide circuits, and double on their tracks so often in going and returning, that the nests are very hard to find. There is nothing to do in such cases but to confine the turkey or to follow her day after day until the nest is found. If she is to be confined, it should be done as soon as she indicates that she does not intend to take one of the nests provided or to make one at home. When, in spite of efforts to prevent it, a turkey hen makes a nest at a distance and has laid some eggs in it before the nest is discovered, it is best to allow her to continue to lay there, but the eggs should be removed as soon as laid. The egg of a turkey is about twice as large as a hen's egg. The usual color is a light, slightly bluish, brown, with small spots of a darker shade.

Hatching and rearing. Turkey eggs are often incubated by fowls. A fowl will hatch the eggs just as well as a turkey hen, and may make as good a mother for a few turkeys grown on a small place. For young turkeys grown on the farm, turkey hens make the best mothers, because they take them to better foraging ground and remain with them all the season. It is a good plan, especially when there are more turkey eggs than the turkey hens can cover, to set some fowls on the surplus eggs at the same time that the turkey hens are set. Then, as there will rarely be



FIG. 161. Sheltered turkey nest. (Photograph from the Bureau of Animal Industry, United States Department of Agriculture)

a full hatch from all nests, the young turkeys hatched by the fowls will fill up the broods of the turkey mothers. A fowl will cover from seven to nine turkey eggs. As a rule it is better to give the smaller number. A turkey hen will cover from twelve to fifteen of her own eggs, or even a larger number, but the young turkeys will be stronger if the nest is not too full. The period of incubation is four weeks. Even when normally strong and healthy, little turkeys appear weak in comparison with lively young chickens and ducks or the more bulky goslings. They may be fed the same as young chickens.

It is the common practice to confine the mother to a coop from which the little turkeys can go to a small pen placed in front of it. The pen may be made of wide boards placed on edge, or of light frames covered with one-inch-mesh wire netting. The coop and pen should be moved before the grass becomes much trampled and soiled. The little turkeys can be kept in

such an inclosure for only about a week or ten days. As they increase in size, and as their wings grow, they fly over low obstacles as easily and naturally as little chickens scratch or as little ducks swim. Having once flown out of the pen, they cannot be kept in it or in any inclosure that has not a high fence or a cover. When only two weeks old, little Bronze Turkeys have been seen flying to the top of a five-foot fence and, after a few efforts, reaching it with seeming ease. No matter how contented old turkeys that produced them may have been in confinement, young turkeys become restless as soon as their wings and legs are strong, and, unless prevented from doing so, will begin to roam long distances. They do not wait for the mother, whether fowl or turkey, to take the initiative and lead them. If she is not disposed to rove, they start and let her follow. A turkey hen quickly catches

their spirit and goes with them and keeps them together ; a fowl is likely to follow them reluctantly, allow them to scatter, and lose a part of the brood.

When the little turkeys have reached this stage, the best plan of managing them depends upon circumstances. If there is little danger of enemies disturbing them, they may be given a light feed in the morning and then allowed to forage where they please, the person in charge looking occasionally to see that they do not go too far and, if necessary, bringing them back or starting them off in another direction. In case of a sudden, hard shower the turkeys must be looked up, and if any have been caught out in the rain and have been chilled and



FIG. 162. Turkey brood coop. (Photograph from the Bureau of Animal Industry, United States Department of Agriculture)

wet, they should be warmed and dried at once. The usual way to do this is to wrap the bird in a piece of old flannel and place it in an oven at a temperature of about 100 degrees, or near a stove. If this is done promptly, a bird that seemed to be nearly dead from wet and cold may be running about as well as ever in an hour. A large part of the losses of little turkeys is due to lack of attention in matters of this kind, or to delaying it until the injury cannot be fully repaired.



FIG. 163. Turkey hen with brood. (Photograph from the Bureau of Animal Industry, United States Department of Agriculture)

After the young turkeys are five or six weeks old, they do not need such close watching. They are now so well feathered that their plumage sheds rain, and if they are thrifty, a little wetting will not hurt them. It is at this age that the symptoms of the disease called *blackhead* begin to appear, if it is present, and the turkeys pine away and die one by one. Blackhead is a contagious liver disease which affects fowls as well as turkeys, but is most fatal to young turkeys, because it is a filth disease ;



FIG. 164. Driving turkeys to market in Tennessee. (Photograph from the Bureau of Animal Industry, United States Department of Agriculture)

as has been said, turkeys are especially sensitive to foul conditions, and the young of all kinds of poultry are more sensitive to such conditions than the adults. The germs of the disease pass into the soil with the excrement of affected birds and may remain there for several years. Young birds feeding on land containing these germs may take up some with their food. If the birds are vigorous and thrifty and the land is not badly infected, no harm may be done, but if the birds are weakly and the land is so badly infected that they are constantly taking up more germs, the disease soon develops in acute form.

Many people suppose that if once they have serious trouble with this disease, it is useless for them to try to grow turkeys, but this is an error. The germs of the disease are destroyed by cultivating the land and exposing them to the sun and air. Three or four years of cultivation will rid a piece of land of disease germs, no matter how badly it is affected. The infection is not usually distributed in dangerous quantities all over a farm or all over the land on which the turkeys and fowls have ranged. It is principally on the land near the farm buildings. There would be very little danger from diseases of this kind on farms if those who feed the poultry would make it a practice to scatter food on clean grass or cultivated ground at a little distance from the buildings, instead of giving it (as too many do) on ground that is bare year after year and never cultivated.

On a large farm the turkeys should not require close attention after they are two months old. A little food may be given to them in the morning and again in the evening, to keep them familiar with the person in charge, and if they are inclined to stray too far, they should be rounded up soon after noon and started toward home. Having started in that direction, they may be left to come at their leisure. They should pick the most of their living until the time comes to begin to fatten them. Beginning about three weeks before they are to be killed, they should be fed two or three times a day all the whole corn they will eat.

CHAPTER XII

GUINEAS

Description. The guinea, or guinea fowl, is about the size of a small fowl. It is very much like the fowl in some respects but not at all like it in some others. Naturalists classify it in the pheasant family, but its present place in domestication is so different from that of the pheasant that a poultry keeper hardly ever associates them in his thought. In appearance the guinea is a unique bird. The shape of the body and shape of the head are both peculiar. The body is quite plump, the back nearly horizontal, and the tail short and much depressed. The neck and legs are rather short. The feathers of the neck are short, and the head is bare. The skin of the head and face is a bluish-white. The bird has a small, knoblike red comb and short, stiff, red wattles projecting from the cheeks. The plumage of the body is quite long, loose, and soft, and lies so smoothly that it appears much shorter and closer than it is.

The male and female are of nearly the same size, and so like in appearance that the sex cannot be distinguished with certainty by any external character. The comb and wattles of the male are sometimes conspicuously larger than those of the female, but this difference is not regular. Although the voices of the male and female are different, the difference is not easily described, nor is it readily detected except by people who are familiar with the birds, and whose ears are trained to distinguish the different notes. Both sexes make a rapid, sharp, clattering sound, and also a shrill cry of two notes. The cry of the male is harsher and has a more aggressive tone; that of the female has a somewhat plaintive sound, which some people describe as like the words "come back, come back."

The name "guinea" comes from the country of Guinea in Africa, from which the birds were introduced into America and Western Europe. The male guinea fowl is called a guinea cock ; the female, a guinea hen ; the young, guinea chickens.

Origin. The guinea fowl is a native of Africa. It is said that there are about a dozen similar species on that continent. This species is abundant there in both the wild and the domesticated state, and also in a half-wild state. It was probably brought into partial domestication at a very early date, for it was known to the ancient Greeks and Romans, as well as to the early civilized nations of Northern Africa. It may have been distributed

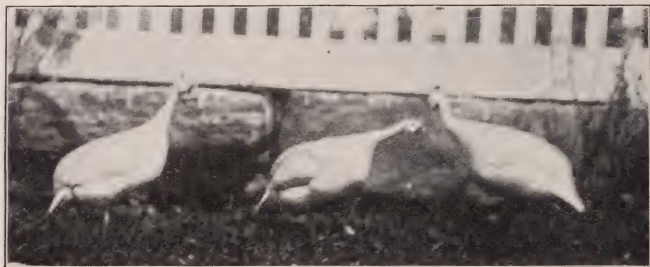


FIG. 165. White guinea fowls

through Western Europe by the Romans. According to one account, some English monks had guineas in the thirteenth century. It is likely that they were rare in Europe at that time and soon disappeared, for the modern Europeans had never seen them until they were taken to Europe from the West Indies, where, it is said, they had been brought by slave ships from Africa. There is a tradition that the first guineas in America were brought direct from Africa with the first cargo of slaves from that continent. In the West Indies and in South America the guinea, after its introduction, ran wild. The natural color of the species is a bluish-gray with many small, round white spots on each feather. On the flight feathers of the wings these spots are so placed that they form irregular bars.

Varieties. The only change that has taken place in the guinea in domestication is the production of color varieties. White sports from the original variety, which is called the Pearl Guinea, were developed as a distinct variety. Crosses of White and Pearl Guineas produced birds with white on the neck, the breast, and the under part of the body. These are called Pied Guineas, but are not regarded as a distinct variety. Birds with the original white markings but with the color very much lighter and sometimes of a decidedly reddish tinge have also been produced by crossing. These are not considered a distinct variety, but are sometimes exhibited as such under the name of "Lavender Guineas." Some of the older works on poultry describe the Self-Colored Guinea, a gray bird without white spots, and the Netted Guinea, in which the original colors are reversed. The author has never seen these varieties, nor has he found any mention of them in the works of later writers.

Place in domestication. The guinea is as eccentric in nature and habits as it is unique in appearance. It is an ill-tempered bird, very pugnacious, and persistently annoys any other birds with which it comes in contact. While inclined to be shy of man and to resent his control, it likes to establish itself between wild and domestic conditions, where it is independent yet enjoys the safety from its enemies that proximity to the habitations of man affords. The hens are very prolific layers. This characteristic is said to be as well developed in the wild as in the domestic stock. Although they lay so well, they are not usually considered desirable for egg production, because the eggs are small and it is hard to keep the birds under such control that the eggs are easily secured. The flesh and skin of the guinea are quite dark in color. The dressed carcass is not at all attractive in appearance, but the meat is very good. Many people prefer it to the flesh of the fowl.

The guinea is not really a domestic bird. It is possible to keep a few in confinement and to rear the young with other

poultry, but the adult birds are so noisy and vicious that very few people want them near the house or with other poultry. They would not be tolerated as much as they are but for the traditional notion that their noisy clamor keeps hawks away. Many farmers keep a few guineas, supposing that they are of service in this way. Those who have tried to find out whether the noise of the guinea really has any effect on hawks say that the hawks are just as bad where there are guineas as where there are none.



FIG. 166. White guinea hen with brood

The only way that guineas can be made profitable is by treating them as half-wild birds —letting them establish themselves in the woods where they can maintain themselves —and then shooting or trapping a part of the flock each season. The number of guineas now produced in this way is steadily in-

creasing in many parts of the United States where the winters are not severe and where wild animals which prey upon game birds are kept in subjection.

Management of domestic guineas. As has been stated, guineas are so hard to control that few persons try to keep them in close quarters or where they must have particular attention. When a few birds are kept on a farm, they are usually allowed to wander at will ; the owner secures as many of their eggs as he can find before they spoil, and perhaps hatches a few of them under hens, for the guinea hens often lay a long time without going broody. As they are prone to hide their nests and are very clever in eluding observation, it not infrequently happens that, when a

nest is found, it contains a great many eggs, a large part of which have been spoiled by long exposure to the weather.

The first care of the breeder of these birds is to see that he has suitable proportions of males and females. Guineas are disposed to mate in pairs. Some poultry keepers who have observed them closely say that while one or more extra females may associate with a pair, the eggs of the extra females do not usually hatch well. Occasionally it happens that a small flock are all males or all females, and the owner does not find it out until too late in the season to get a bird of the missing sex. When a supposed guinea hen does not lay in the breeding season, the owner often thinks that she lays but manages to completely baffle his search for the nest.

The period of incubation for guinea eggs is four weeks. The young birds may be managed the same as young turkeys while small, but do not need as close watching to keep them from wandering away. Those that are hatched and reared by fowls are tamer than those reared by guinea hens, but are not so hardy.

CHAPTER XIII

PEAFOWLS

The peacock, or male peafowl, when matured and in full plumage, is the most gorgeous of birds. Many smaller birds are more brilliant in color. Many birds of various sizes and types have beautiful or interesting characters as attractive as those which distinguish the peacock. But this bird surpasses them all in attractiveness, because in it are combined in the highest degree size, beauty of form, beauty of color, and the power of displaying its beauties to the greatest advantage.

Description. The adult peacock is so much more striking in appearance than the females and the young males, and old males are so often exhibited alone, that many persons suppose that the peafowl are distinctly unlike other domestic birds. The size, shape, and carriage of the peacock sometimes suggest to them a resemblance to the turkey gobbler, but the peacock's most striking characters seem so peculiar to it that the attention of the observer is usually fixed upon them, to the exclusion of direct comparisons with other creatures. When, however, one sees a flock containing several females, or males in which the characteristic plumage is not yet developed, the general resemblance between peafowl and turkeys is immediately noticed. The peafowl is smaller, slenderer, and more graceful than the turkey, and is a little more agile in motion. But if there were no old males present to identify the species to which they belong, a person who was not familiar with peafowls, seeing a flock for the first time, would be almost certain to think that they were turkeys of a rare breed. Notwithstanding this striking general likeness, a close observer will soon note that in nearly every

conspicuous character the differences between the two indicate that they belong to entirely different species. The voice of the peafowl is a harsh, piercing scream.

The development of the plumage in the male at full maturity is like that of the fowl and of some pheasants. In all of these species in which the tail of the male assumes a highly decorative form, it is not the tail proper that is so developed, but the tail coverts and other feathers of the back, which in the male are long and flowing. In the peacock these feathers are very remarkably developed, both in form and in color. The largest are

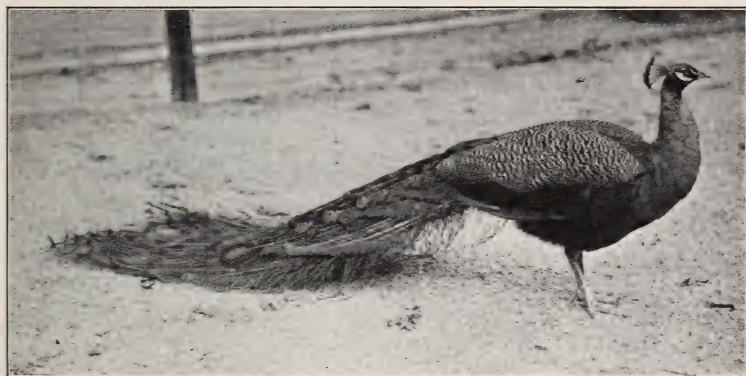


FIG. 167. Indian Peacock. (Photograph from the New York Zoölogical Society)

sometimes a yard long. The stem, or shaft, is a marvelous combination of lightness and strength. For the greater part of the length of the shaft the barbs are so far apart that they do not form a web, but make a fringe on each side. Toward the tip of the feather the barbs are closer together, and at the extremity they form a broad web. The feathers of this structure growing next to the main tail feathers are the longest. The next are a little shorter, and thus the length diminishes until the shortest coverts are only a little longer than the ordinary feathers of the back. This feather formation is called the train. The train of

the peacock is the most prominent peculiarity of the species, but there is also in both sexes another uncommon feather character — the curious little tuft, or crest (called the aigret), which grows on the head.

The surface color of the peacock is a marvelous blending of purples, greens, golds, and bronzes of various hues. On the head and neck purple tints predominate. The train is mostly green with large, eyelike spots, or spangles, at the tip of each feather. The plumage of the female is a soft brown on the body, darkest on the back and shading to nearly white on the abdomen. The brown often shows slight tints of purple and green. The neck and throat are a purple-green ; much less intense than the coloring on the male. The young males are colored like the females until they molt in their second year. Then they become much darker, but it is not until the next molt, in their third year, that they grow the characteristic train and take on the brilliant coloration which is their greatest attraction.

The wild peafowls in different parts of Asia vary somewhat in color and are sometimes thought to be of different species, but they are evidently all varieties of the same species. Specimens of all are seen in domestication. One variety is almost black. Domestic life has had little if any effect upon the type of peafowls. A white variety has been produced, and from the mixture of this with the green variety, birds that are partly white are sometimes obtained.

The significance of the terms "fowl," "cock," "hen," and "chick," or "chicken," in combination with the "pea" in the name of this bird is, of course, perfectly plain. Those who seek further meaning in the first syllable are puzzled until they consult the dictionary and find that the three letters as they occur here are not the word "pea," but a contraction of *pawa*, which was an Anglo-Saxon corruption of *pavo*, the Latin name of the bird. While the original meaning of the name is not known, the word came into the Latin language from the Greek, into

which it had previously come from the Persian. Hence, the history of the name indicates that the distribution of the peafowl was along much the same lines in Europe as the distribution of the fowl.

Origin. The peafowl is supposed to be a native of Java and Ceylon. It is found throughout Southern Asia and is said to be very numerous in India and Ceylon, both in the wild state and in a half-domestic state. It was known to the Jews in the time of Solomon, and to all the ancient civilized peoples of Western Asia, Europe, and Africa at a very early period. In the days of the Roman Empire a peacock served with the feathers on¹ was a favorite dish at the feasts of wealthy Romans, and this mode of serving the bird was continued in Western Europe for many centuries. At what time they were introduced into that part of the world is not known, but it is probable that they were distributed to the various countries soon after the Roman conquests. Nor is anything known of their first introduction into America. It is, however, quite reasonable to suppose that some were brought here at an early date by wealthy colonists.

Place in domestication. In Europe and America the peafowl is now bred only for ornamental purposes. That seems to be its status even in the Asiatic countries, where it is most abundant, and its position has probably been much the same in all lands and in all ages. The use of fully developed peacocks for food at banquets was simply a display of barbarous extravagance. Although a young peafowl is very good eating, a male old enough to have acquired its full plumage would be hard, tough, and unpalatable. The peafowl is not prolific enough to be a

¹ Of course the bird was not cooked with the feathers on, but was skinned, the feathers remaining in the skin, and after the flesh was cooked the skin with the feathers was placed over it before it appeared on the table. Skinning poultry instead of plucking the feathers seems to have been quite a common practice in old times. As recently as between 1880 and 1890 the author heard of people who preferred it as the easiest way of preparing chickens to be cooked immediately.

profitable table bird, and is too desirable for its beauty to be used for any other purpose. In this country peafowls are not common. Very few are seen except in zoölogical collections and at the principal poultry shows. The scarcity of peafowl is not due wholly to the expense of procuring them or to the difficulty of rearing them. Indeed, neither of these constitutes a serious drawback to their popularity. The peafowl is its own worst enemy in domestication. It has a very savage disposition toward smaller birds, and in this way usually makes itself an intolerable nuisance to those who grow other poultry. Many owners of large farms, who do not keep turkeys, or who keep only a small flock, might maintain a small stock of peafowl with very little trouble. Although they are so vicious when brought in close contact with smaller poultry, they will flock and forage by themselves if they have room to do so.

Management. The methods of managing turkeys apply to nearly every point to the management of peafowl. The peafowl matures more slowly and does not breed so early. The females are not fit for breeding until two years old ; the males not until three years old. They do not pair, but mate in small polygamous families — one male with from two to four females. The peahen usually lays from four to six eggs — rarely more than eight or ten. The period of incubation is four weeks. Young peachicks are very bright and active. They begin to fly when only three or four days old. If they are to be kept in an inclosure while very small, the sides must be high or the top must be covered with wire netting. Although so active, they are less independent than most young poultry, and follow the mother closely until she drives them from her at the approach of the next breeding season. Peahens are preferred as mothers, because their disposition is to keep their young with them much longer than a turkey or a fowl does. Next to the peahen a turkey hen makes the best mother for peachicks.

CHAPTER XIV

PHEASANTS

The guinea and the peafowl were described as closely related to the pheasants, and as of limited usefulness to man both because of their ugly dispositions and because of their roving habits. The species of pheasants that are best known are a little farther removed from domestication by their extreme shyness, and have often been excluded from lists of domestic birds; yet it is quite possible that some of them may become of much greater economic importance in America than either the guinea or the peafowl.

Description. The most common kinds of pheasants are about the size of small domestic fowls, but have rounder, plumper bodies. There are also other characteristic differences. The head of a pheasant, except a part of the face around the eye, is usually feathered. This bare skin, called the wattle, is red in most species, but in a few it is purplish. The feathers of the neck are short, and the tail is depressed. Some of the rarer kinds of pheasants are as large as medium-sized fowls.

Pheasants as a class are distinguished principally for their brilliant plumage. In most species the male alone has showy coloring, the females being very sober hued. In some species the male has a very long tail, corresponding to the train of the peacock; in some the tail is wide and heavy, as well as quite long; in others the males are feathered like the females.

The name "pheasant" comes from the name of the river Phasis in Colchis, at the eastern end of the Euxine Sea. The term "fowl" is not used in connection with "pheasant," but the words "cock," "hen," and "chicken" are used as in other cases that have been mentioned.

Origin. The pheasants are all natives of Asia, where nearly all known kinds are found in the wild state. They are well distributed over that continent, and are found in localities differing greatly in climate and in the character of the soil and of the vegetation. Some species live mostly at low altitudes; others are peculiar to high mountain regions. According to an old Greek legend the first pheasants known in Europe were brought to Greece by the Argonauts on their return from the expedition in search of the Golden Fleece. A more probable story is that which says that they were introduced in the time of Alexander the Great. Pheasants were reared in confinement for food by



FIG. 168. Ringneck Pheasant¹

the Greeks and the Egyptians, and also later by the Romans in Italy. Both the rearing and the use of pheasants in those times seem to have been limited to the very wealthy. From Greece and Italy they were gradually distributed all over Europe.

History in America. The history of pheasants in America is much more fully known than that of most kinds of poultry. The first importation of which there is a record was made by an Englishman named Bache, who had married a daughter of Benjamin Franklin. In England at that time pheasants were propagated, as they are to-day, in a half-wild state in game preserves, and Mr. Bache expected that those which he imported

¹ Figs. 168-172 are from photographs of mounted specimens in the National Museum, made to illustrate "Pheasant Raising in the United States," *Farmers' Bulletin No. 390* of the United States Department of Agriculture.

and released on his estate in New Jersey would soon become established there. In this he was disappointed. Others who subsequently tried the same plan met with no better success. For a long time the only pheasants known in this country were those grown in confinement by fanciers.

The first successful attempt to establish pheasants at liberty on this continent was made in Oregon with pheasants brought direct from China. The United States consul at Shanghai sent some Ringneck Pheasants to Oregon in 1880. As most of these



FIG. 169. Mongolian Pheasant

died on the way, a second shipment was sent in the following year. In all about forty birds were liberated. The shooting of pheasants was prohibited by law in Oregon until 1892, when the stock had become so widely distributed and so well established that shooting them was allowed for a short season. So numerous were the pheasants at this time that on the first day of this open season about 50,000 were shot by the hunters. In many other states efforts have since been made, both by state game commissions and by private enterprise, to acclimatize pheasants and establish them as game birds. Some of these efforts have been quite successful.

Species and varieties. The relationships of the various kinds of pheasants are not positively known. Some kinds that are undoubtedly varieties of the same species are commonly classed as different species. The best-known of these so-called species interbreed freely. The rare kinds have not been sufficiently tested, either with common kinds or with one another, to show



FIG. 170. Amherst Pheasant

whether they are species or merely varieties. The European pheasants, descended from the stocks which came in early times from Western Asia, are called by various names — Common Pheasant, Darknecked Pheasant, English Pheasant, and Hungarian Pheasant. Two kinds of pheasants, of the same type but having more distinctive color markings, have in recent times been brought from Eastern Asia. One of these is commonly

called the Ringneck Pheasant, but the names "China Pheasant," "Mongolian Pheasant," and others are also applied to it. The second variety, also called Mongolian Pheasant, is said by some authorities to be the only one to which the name "Mongolian" properly applies. It is not quite like the Ringneck, but, like it, has a white ring around the neck. From Japan still another bird, called the Versicolor Pheasant, or Japanese Versicolor Pheasant, very similar in type, was brought to England. These three varieties from Eastern Asia have been mixed with the European pheasants to such an extent that there are now very

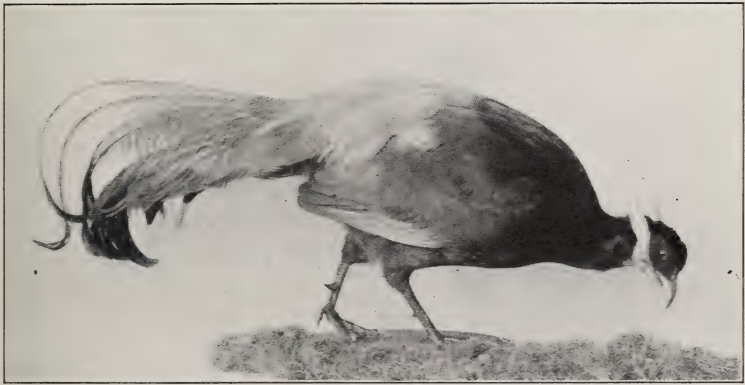


FIG. 171. Manchurian Pheasant

few pheasants of the type common in Europe before their introduction, and good specimens of the oriental races are equally rare. The principal English variety at the present time is a Ringneck produced from the mixture. This is called the English Pheasant; in England it is also sometimes called the Common Pheasant. The birds that breed at liberty in the United States are mostly of the Ringneck type.

Although they are very beautiful birds, the pheasants thus far mentioned appear plain in comparison with the Silver and the Golden Pheasants (which are the most common of the highly ornamental varieties) and the Reeves and Amherst Pheasants.

These are the kinds most often seen in aviaries and at poultry shows. There are many other rare and curious varieties which are to be seen only in the finest collections. Among these is a class called the Eared Pheasants, because of the little tufts of feathers which project backward at each side of the head, looking strikingly like the ears of a mammal. The pheasants of this class are mostly dull colored and quite docile in disposition.

Place in domestication. The future place of pheasants in domestication is not so plainly indicated by their history and



FIG. 172. Monaul, a Himalayan pheasant

present position as the places of the guinea and the turkey seem to be. Pheasants seem to be more desirable, easier to control, better suited to confinement, and also better adapted to wintering out of doors in cold climates, than are guineas. The beauty of the ornamental types makes them very desirable to those who keep birds for pleasure. Because they are so much smaller than peafowl, and also because they are able to live amicably with fowls, they may be kept where peafowl could not. It is there-

fore probable that, as people in America become more familiar with pheasants, and as they learn that the greatest pleasure and the surest profit in aviculture are to be found in growing a few birds under the most favorable conditions that can be made for them, the numbers of pheasant fanciers will greatly increase.

In England pheasants are extensively grown in game preserves, for shooting and for sale as breeding stock to those

who wish to stock new preserves. Where the birds are fed by a keeper, as they must be when they are very numerous, they become so tame that hunting them is not very exciting sport. Some that have been released in this country, and have lived in a natural state in places where shooting them was not allowed, have become quite as tame as the birds in the English preserves. Altogether the history of efforts to establish pheasants in a wild state with a measure of protection from hunters shows that it would often be practical for owners of woodland and waste land to establish and preserve colonies of wild or half-wild pheasants. Whether this will be done to any great extent depends upon the extermination of wild animals and upon the placing of proper restrictions upon the domestic animals (dogs and cats) which are destructive to land birds; it depends also, to some extent, upon concert of action among the landowners in a community, in securing for themselves the use of the pheasants grown on their lands.

The possibility of domesticating pheasants of the Manchurian type, and one or two other rare varieties that, when seen on exhibition, appear very docile, is also to be taken into account. The United States Department of Agriculture¹ has called attention to the fact that some of the little-known kinds of pheasants seem especially adapted to domestication. Even before that, many poultrymen, seeing these birds at exhibitions, had been impressed by their appearance, and had remarked that they looked like birds that would become thoroughly domestic. At the present time persons desiring to grow any of the more common varieties of pheasants for table use should first ascertain how the game laws of the state in which they live, and of any state into which they might want to send pheasants, would affect their undertaking. Sometimes the laws made to protect pheasants in a wild state have been passed without due regard for the interests of persons growing them in captivity. Errors of this kind are

¹ Pheasant Raising in the United States, *Farmers' Bulletin No. 390*.

usually adjusted before long; meantime those who may innocently break a law find the situation very embarrassing.

Management of pheasants in confinement. The breeding of pheasants on a small scale may be carried on in any place where suitable runs can be made for them. The first essential is a somewhat secluded site where the birds will not be subject to frequent disturbances. It should be near enough to the owner's dwelling to enable him to keep watch of what goes on in its



FIG. 173. Coops and yards for breeding pheasants. (Photograph from Simpson's Pheasant Farm, Corvallis, Oregon)

vicinity, yet not so near that the movements of the members of the household, as they go about their ordinary affairs, will disturb the pheasants. It should be where trees or bushes make a natural shade but not a dense shade; a place where the sun and shade are about equal on a clear day is best. A light sandy or gravelly soil is to be preferred, and a clay soil should be avoided. If the land has underbrush on it, this need not be cleared from the space occupied by the run, unless it is so thick that it shades the ground too much.

The house should be of about the same size and construction as would be used for a few fowls. A roosting place should also be made in the yard, for as a rule the birds will prefer to roost outdoors. The house is to afford them proper shelter from severe storms and during prolonged damp weather. For either a pair or a pen of a male and several females the yard should contain about 600 square feet. The fences inclosing it should be at least 6 feet high, and the top should be covered with wire netting.



FIG. 174. Young China Pheasants at feeding time. (Photograph from Simpson's Pheasant Farm, Corvallis, Oregon)

The Silver, Soemmerring, and Swinhoe Pheasants mate in pairs; the other familiar kinds are polygamous, and from one to five or six females may be kept with one male.

Pheasants may be fed the same things as are fed to fowls, and in much the same manner, but there is one important difference which the pheasant breeder must carefully observe. Fowls will stand abuse in the matter of diet much better than pheasants will. In feeding the latter more attention must be given to providing regular supplies of green food, to having all

food sound and good when fed, and to regulating the quantity given for a meal so that it will not lie about and become sour or soiled before it is eaten.

Most pheasant fanciers use large bantams or small common hens to hatch and rear the young pheasants. The period of incubation is from twenty-two to twenty-four days. Until they are weaned from the hens the little pheasants may be managed as young chickens are, but with the same attention to variety of food

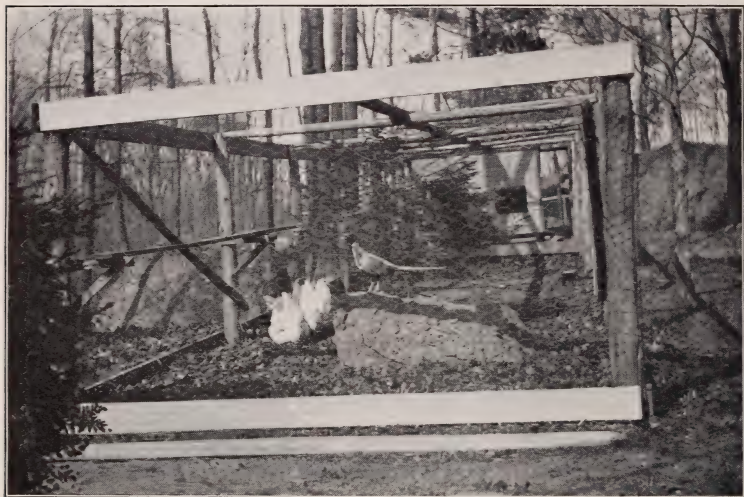


FIG. 175. Fowls and pheasants in same yard on a New England poultry farm

and to moderation in feeding that has been specified for the old birds. A small number with a good range on grass or in a garden will pick much of their food. Many of the older works on poultry which treated of the care of pheasants recommended for the young birds a great variety of foods not easily provided. Nowadays the most successful amateur fanciers feed either a mixture of the common small grains or some of the commercial mixtures which contain, in addition to these, a number of seeds and grains not much used by poultry keepers who buy their grains separately in bulk. Stale cracked corn, which is dangerous

to all young poultry, is especially to be avoided in feeding young pheasants. After the young pheasants are weaned, they must be kept in covered runs, or their wings must be clipped to prevent them from flying.

A large pheasantry is operated on the same general lines as a plant where birds are grown in small numbers. The method is simply an extension of that just described. When only one kind of pheasant is kept, the inclosed yard is sometimes made very large, and a hundred or more birds are put together. This is not good practice with any kind of poultry, and is no doubt responsible for much of the trouble which those growing pheasants in large numbers have had. At aviaries where there are large collections of pheasants, including many rare and costly kinds, the yards are always made large enough to give the birds good sanitary conditions, and as a rule each family of adult birds, whether composed of two or more, has a yard to itself.

CHAPTER XV

SWANS

Naturalists divide swans into a number of different species. Whether this division is correct is not known. The habits of swans, and the circumstances under which they are usually kept, tend to prevent the mingling of different kinds. As far as the author has been able to learn, there is no evidence which shows conclusively the relations of any of the supposed different species. The differences between them are in some cases very slight. Some of the decisions of the naturalists who have classified slightly different kinds as distinct species are based upon examinations of very small numbers of specimens. Considering the apparent resemblances of the different kinds of swans in the light of what is known of species and varieties in fowls, ducks, geese, and pheasants, it seems probable that the true species of swans are fewer in number than the common classification shows, and it also seems quite possible that all swans are of the same species.

Description. The common swan, called the domestic swan, is about the size of the largest domestic geese, but appears larger because it has a longer neck and head and larger wings. The body is also somewhat longer than that of a goose of about the same weight, and the swan is a much more graceful bird than a large goose. It is sometimes called the Mute Swan, to distinguish it from the Whistling Swan, which is a very similar kind not bred in domestication. There are other slight differences between the Mute Swans and the Whistling Swans, but the difference in the voice, if it really is as great as is supposed, is the only one of much consequence in deciding their relations. The Mute Swan

is not dumb. It sometimes makes a low, whistling sound. People are not agreed as to whether there is any real foundation for the familiar tradition that the Mute Swan remains silent until about to die, and then sings a "song." Some people acquainted with the habits of swans declare that the swan is more vocal when dying than at any other time in its life. Others say that the idea probably arose as a result of some one's hearing a dying swan moaning in pain, as sick animals and birds often do, and concluding that it was uttering a series of sounds characteristic of swans in a dying condition. However that may be, the Mute Swan is distinctly less noisy than the wild Whistling Swan.

Until 1697 all swans known to civilized people were white, and the swan was an emblem of purity of color. In that year a Dutch navigator visiting Australia found there a black swan. Afterwards a white swan with a black neck was discovered in South America. Had the subject of heredity been well understood before the discovery of these two swans that were not white, people familiar with the white swans would have known that there were colored swans in some unexplored country (or that they had existed in the known world in a former age), for white swans are not perfectly white at maturity, and when young they are gray. Neither is the black swan all black. It has white flight feathers, and its black color is a rusty black, that is, a black mixed with red.

Swans are very long-lived birds, but stories of swans living to seventy or eighty years of age are not to be credited. It cannot be affirmed that the birds may not live as long as that, but the evidence in the cases reported is defective. The reports of swans living for fifty years are quite credible. The male and female swan are not readily distinguished, for there are no external indications of sex, and the birds use their voices so rarely that, even if there is a difference in the notes of the male and female, it is not practical to use it to distinguish

between them. The only way to identify the sex with certainty is by observing the birds at nesting time.

The name "swan" is Anglo-Saxon. Nothing is known of its derivation. The terms "cock" and "hen" are sometimes applied to swans as they are to many other kinds of birds. The swan-herds in England call the male a *cob* and the female a *pen*. The young swan is called a *cygnet*, from the French word for "swan."



FIG. 176. Swan and nest

Origin and history in domestication. Tradition says that the domestic swan was brought to England from France by Richard the Lion-hearted. As the swan is a migratory bird, still sometimes seen in many parts of the Eastern Hemisphere north of the equator, it is possible that swans were known in England long before the reign of this king. However that may be, it is certain that, from about the time of the Norman Conquest, the swan has occupied a peculiar position in England. It was regarded

as a royal bird, and the privilege of owning swans was granted only to those in high station. At first the number of those who were permitted to own swans was very small, but it was afterward extended until, in the reign of Queen Elizabeth, more than nine hundred different swanmarks were registered by the royal swanherd, who had general oversight of all the swans in the kingdom. The swans were marked by branding or cutting the bill, this being necessary because they lived largely on the margins of uninclosed waters, just as in some of our Western states cattle live on unfenced lands. The right to own swans carried with it the right to keep them in such a place.

Place in domestication. Although it has been bred in captivity for centuries, the swan is not fully domesticated. It does not, like the duck and the goose, so increase in size and weight when kept under the control of man that it becomes incapable of flight, but, like the American Wild Goose in captivity, it is prevented from flying by removing the first joint of one wing, the operation being performed as soon as possible after the young birds are hatched. The swan lives more on the water than either the duck or the goose. It subsists largely upon coarse aquatic grasses and plants, and is said to eat all kinds of decaying matter found in the water.

In England in old times the swan was used as food by the wealthy, but its use for this purpose ceased long ago. It is now kept almost exclusively for ornament. Most of the swans in America are kept in public parks or on large private estates. Very few are reared here; the supply is kept up largely by importations from England. The swan is not popular, because the birds are costly and are not prolific. Still the breeding of swans for ornamental purposes or for sale to exhibitors might be carried on with profit upon many farms. Under suitable conditions, swans may, at the same time, perform valuable service and make a valuable product. By consuming the kinds of food which they prefer, they clean ponds and keep sluggish streams

open. Being so large and strong, and requiring so much coarse food, they are a great deal more servicable in this way than are ducks and geese.

Management. When swans were abundant in England, they were kept mostly upon certain rivers and inlets of the sea where natural food was abundant. The climate of England is so mild that they can there obtain food in such places at all seasons. The colder parts of America do not afford conditions favorable to swan culture. Where the winters are long and severe, and streams and ponds are frozen over for months, wintering swans would be troublesome and expensive, but where the waters are open throughout the year, a farmer who had a suitable place for them might breed swans with profit. A pair of swans would cost about the same as a good cow, and might make about the same net profit. But there would be this difference: the cow would require a great deal of care, the swans very little; the cow would eat salable food, the swans mostly waste food. By this comparison it is not meant to suggest that a farmer might profitably replace his cows with swans. The object is simply to show how the possible profit from small specialties compares with the usual profit from a regular feature of farming.

The methods of managing swans are much like the methods of managing wild geese in captivity. The principal difference is that the swans must have a larger body of water, and one in which vegetation is abundant. They are not as fond of land grasses as geese are, and like to float on the surface of the water, feeding on the vegetation at the bottom. Their long necks enable them to do this in water several feet deep. They need no shelter but a small hut, which they will use only in rare emergencies. After they have settled down in a spot, there should be no need of building fences to restrain them. As they are not able to fly, they will remain quite near their home unless food supplies there are very short. In that case extra food should be given them. Even when natural food is abundant,



FIG. 177. Feeding swans on the water

it is a good plan to feed swans a little of something else occasionally, to attach them to the person who has charge of them. As every one knows who has seen the swans in parks, where visitors amuse themselves by feeding them, swans are very fond of bread. They will eat grain also, although, when not accustomed to it, they may at first refuse it. Their food is usually given either by throwing it on the water or by placing it in troughs from which the birds can eat while floating upon the water.



FIG. 178. View of an English swannery

The female builds near the water a nest of coarse stalks and small sticks. Sometimes this is reared to a height of several feet, and material added around the sides, little by little, during the whole period of incubation. Swans have been known to pile up nearly half a cord of material for their nest. From five to ten eggs are laid in the nest. The period of incubation is six weeks. As far as possible, interference with the birds should be avoided during the breeding season and while the young are small. When it is necessary to handle them in any

way, the attendant should have at the start all the assistance he is likely to require. A blow from a swan's wing may injure a man very seriously. It is said that such a blow has been known to break a man's thigh.

The young are gray when hatched and do not become entirely white until two years old. Even then many of them are not absolutely white, but show very distinct traces of reddish-yellow, especially on the head and upper part of the neck. There is a story that a young swan of a deep buff color was hatched at Lewes in England.

If the swans with young must be fed, the usual practice is to throw the food upon the water. Stale bread, grain, and even meal are given in this way. It looks like a wasteful way of feeding, but the birds will get all the food.

Swanneries are unknown in America. In England a few of those established many centuries ago still remain. The largest and most celebrated of these is at Abbotsbury. Swans have been bred here continuously for about eight hundred years.

CHAPTER XVI

OSTRICHES

The ostrich is unlike other birds in many important characters. It is not a typical bird. While it has feathers and wings, its feathering is not normal, and the muscles of the wings are lacking. In the minds of most persons it is associated with the circus menagerie rather than with the poultry yard, but, as we shall see, this singular bird has a place in domestication and, as a useful land bird, belongs to the poultry group. There are two species of ostriches, but only one of these is of economic value.

Description. The ostrich is the largest of living birds. A full-grown male standing erect measures from six to seven feet in height. The largest specimens weigh about three hundred pounds. As, in the atmosphere which now surrounds the earth, a creature of such size and weight cannot fly at all, the wings of the ostrich have become atrophied, and the muscles of the wings, which form the plump, meaty breasts of flying birds, are entirely wanting. Not only have these muscles disappeared, but the breastbone, which in flying birds is very large in proportion to the rest of the skeleton, and has a deep, longitudinal keel in the middle, is comparatively small in the ostrich and has no keel at all. The ostrich, having no power of flight, is dependent for safety upon its speed in running ; so its legs are long and strong, and the muscles which move them are very large. Indeed, there is very little meat on an ostrich except on the thighs. It can run much faster than a horse. Because its foot must be adapted to running at great speed, the ostrich has only two toes. Its neck is very long and slender, and its head is very small and flat. In such a head there is little room for brains. The ostrich

is a very stupid creature, but it does not, as is commonly supposed, hide its head in the sand and imagine that, not being able to see its enemies, it cannot be seen by them. That is a myth apparently based upon the fact that, when in repose, an ostrich sometimes lies with its long neck stretched upon the ground.



FIG. 179. Side view of male ostrich. (Photograph from the Bureau of Animal Industry, United States Department of Agriculture)

Since the wings of the ostrich are useless for flight, the flight feathers have lost the structure adapted to that purpose and have developed into beautiful plumes. The tail feathers have also undergone a similar change. These wing and tail feathers are the ostrich feathers of commerce. The neck and head of the ostrich are almost bare of feathers. The body is covered

with feathers, but not as densely as in most birds. There are just enough feathers on the body of an ostrich to protect the skin from exposure when they lie flat. The areas on the skin where there are no feathers are much larger than on other birds. The thighs of the ostrich are bare. The skin is in some varieties of a bluish-gray; in other varieties the bare parts are red and the skin of the body is yellow.

The crop and the gizzard of the ostrich are not separated as in other birds, but are joined; the upper part of the stomach performs the functions of a crop and the lower part those of a gizzard.

The male ostrich is usually larger than the female. The adult males and females are plainly distinguished by the color of their plumage, the body feathers of the male being black, while those of the female are gray. The plumes of both sexes are white or white mixed with black. The black on an ostrich is often of a brownish shade, and this is most conspicuous when it appears on the plumes.

The bill of the male and the scales on the fronts of his shanks become a bright rose color in the breeding season. The male ostrich utters a guttural sound, called booming, which is said to resemble the roar of a lion as heard at a distance. The voice of the female is like that of the male, but very faint.

The difference in the plumage of the sexes, although it is not complete until after the second adult molt, is noticeable much earlier. The females do not begin to lay until three or four years old. The males are not fully matured until four or five years of age. Ostriches are very long-lived. Birds whose age could be verified have lived as long as forty-five years in captivity, and at that age were profitable as breeders and also as feather producers. It is believed by some of those most competent to judge such matters that under favorable circumstances an ostrich might live a hundred years or more. Very few of the birds kept in domestication die of old age. They are

so stupid, and their long legs, though strong for running, are so easily broken, that an accident of some kind almost always ends the life of an ostrich long before it has passed its prime.



FIG. 180. Front view of male and female ostriches. (Photograph from the Bureau of Animal Industry, United States Department of Agriculture)

The name "ostrich" has an interesting history. The Greeks called this singular bird *struthiōn'*. This came into the Latin language as *struthio*. In low Latin, *avis*, the Latin word for "bird," was prefixed to what remained of the Greek name,

giving *avis struthio*. "Ostrich" is a contraction of this low Latin compound. So we have in this name a combination of two words from different languages, having the same meaning. The terms "cock," "hen," and "chick" are used with the name of the species, to designate respectively the adult male, the adult female, and the young before the first plucking.

Origin and history in domestication. The domestic ostrich is the wild African ostrich in captivity. It is probable that the ostrich was familiar to the people of Northern Africa, and was known to those of the adjacent parts of Asia and Europe, in prehistoric times. In very early times ostriches may have been kept in captivity for their feathers, as they are now kept in the Sudan, but, until about 1860, when the farmers of South Africa began to take an interest in the subject, we have no knowledge of any efforts to breed ostriches in captivity and to improve the quality of the feathers by giving the birds more nutritious food than they usually get in the wild state. The first stock used in South Africa was some of the wild stock found in that part of the continent. In 1882 the first ostriches were brought to the United States.

Place in domestication. Commercially the ostrich is valuable only for its plume feathers. The extent of the development of ostrich culture depends upon the demand for ostrich feathers at prices that will warrant breeding ostriches to supply them. When the industry was first established in South Africa, ostrich feathers brought high prices and the business was very profitable; but so many farmers engaged in it, and the supply of feathers increased so rapidly that prices soon became much lower and have never since returned to the scale that prevailed at that time.

The flesh of the ostrich is edible, but it is so hard and tough that no one would grow ostriches for their flesh. The egg of an ostrich is about as large as two dozen hen eggs. Ostrich eggs are said to be very good, but they are too large for ordinary

use, and the birds are so long in maturing that it would not pay to use them to produce eggs for commercial purposes.

The breeding of ostriches for their feathers, however, may be regarded as a permanent industry, for there will always be a demand for ostrich plumes, but it cannot be developed as extensively as if the product were a staple article of food. The ostrich farms in America are mostly special farms devoted exclusively to ostrich breeding. Most of these farms are owned



FIG. 181. Ostrich eggs and newly hatched chicks. (Photograph from the Bureau of Animal Industry, United States Department of Agriculture)

and operated by companies. Some of them are stock speculation projects. In South Africa the industry is more in the hands of the general farmers, each of those engaged in it growing a few birds. The people of South Africa have tried to secure a monopoly in ostrich feathers by prohibiting the exportation of ostriches and by purchasing the best stock to be obtained in North Africa. Ostrich farming is practical only in tropical and semitropical countries; the plumage of the birds is too scanty to protect them in the cold winters of temperate climes. In the United States

nearly all the ostrich farms are in Southern California and Arizona, but there are some in Texas, Arkansas, and Florida.

Management. In the places where ostrich farming is carried on, the birds need no shelter. They must be kept in inclosures fenced as for cattle. As ostriches are bred for their plumage, and that of the male is most valuable, the breeder does not object to their following their natural inclination and mating in pairs, but many males are so injured in fighting that they must be killed. This leaves an excess of females, and so two or more females are sometimes mated with one male. The birds are mated for breeding when they are about three and one-half years old. The object of mating them before they are fully mature is to prevent them from selecting for themselves partners contrary to the ideas of the breeder. Each mating must have its own yard, unless the place where more than one family is kept is large enough to allow each family the exclusive use of a part of it. Under such circumstances each group will keep to its own range.

The natural food of the ostrich is grass and the leaves of shrubs and trees. In domestication it is usually pastured on alfalfa, or fed on alfalfa hay, according to the season. The alfalfa is often supplemented with grain (principally corn), and grit, bone, and shell are provided as for other birds.

Most ostrich growers prefer to hatch the eggs in incubators, because by removing the eggs from the nests they induce the hens to lay more, and because the young ostriches are much easier to manage when by themselves than when with the old birds. When a pair of ostriches hatch their own eggs, the hen sits during the day and the cock at night. The period of incubation is six weeks.

Young ostriches are fed the same as old ones. They are kept in flocks of fifty or more until about a year old, when the sexes are separated. The plumes are cut for the first time when the birds are between six and seven months old. Although the



FIG. 182. Flock of ostriches on a California ostrich farm. (Photograph from the Bureau of Animal Industry, United States Department of Agriculture)

process of removing these feathers is called plucking, they are not drawn out, but are cut close to the skin. The object is to get the feather immediately after it is grown, before it can be soiled or damaged in any way. At that time the quill is still full of blood. Drawing it out would be very painful to the bird, and might injure the wing so that the next feather that grew would be defective. The stumps of the feathers are allowed to remain until they are dead and dry, when they are drawn out easily. In South Africa the Kafirs draw the stumps out with their teeth. In about six or seven months after the stumps are removed, the new plumes are grown and the process of plucking is repeated.

CHAPTER XVII

PIGEONS

The pigeon is the only species of aërial bird kept in domestication to provide food for man. It is also the only useful domestic bird that is able to maintain itself and increase in numbers in populous districts without the care of man.

Description. The common pigeon is about the size of the smallest bantam fowls. It is a plump, hard-feathered bird, with a short neck, a round head free from ornamental appendages, a short beak, and short legs. The prevailing color is a dull, checkered blue, varying in shade from a very light blue to nearly black. The blue is sometimes replaced by red with similar variations in shade. There are also white pigeons, black pigeons, and many birds in which all the colors that have been named are irregularly mixed.

The male and female pigeons are not distinguished by any regular differences of size, form, color, or voice. The males are usually a little larger and coarser looking, and make themselves conspicuous by their vain posing and domineering ways, but none of these characteristics are reliable indications of sex. The natural voice of the pigeon is a soft, gurgling coo repeated over and over with monotonous effect. It is sometimes heavier and more prolonged in the male, but except in the Trumpeter and Laughing Pigeons, in which the voice has been peculiarly developed, the difference in the voices of the male and female is not marked. Even in the two varieties mentioned, many males have such poor voices that the voice is not an infallible indication of the sex. The most expert pigeon breeders are often in doubt about the sex of some pigeons until they pair.

The name "pigeon" is from the Latin *pipio* (to peep or chirp), and came into the English language from the French. The Anglo-Saxon name for the bird was probably *dufa*, from which we have the word "dove," which is still sometimes applied to pigeons. *Dufa* was derived from *dufan* (to plunge into). It seems probable that the name was given because of the pigeon's habit of dropping almost perpendicularly when descending from an elevated position. The male pigeon is called a cock, the female a hen. Young pigeons are called *squabs*, *squeakers*, or sometimes *squealers*. The word "squab," which means "fat,"



FIG. 183. Tame pigeons. (Photograph from Elmer E. Rice, Boston, Massachusetts)

describes the characteristic appearance of the nestling pigeon; the other terms refer to the noise it makes as it persistently begs for food.

Origin. Domestic pigeons are all descended from the wild Blue Rock Pigeon of the Old World. Although many of the improved varieties have been greatly changed in form, they are

all perfectly fertile when bred together. The Blue Rock Pigeon is found in the wild state in Europe, Asia, and Africa. "Fancy Pigeons," by James C. Lyell, the best authority on the subject, contains this statement: "The British Blue Rock inhabits the rocks and caves on our seacoasts, as well as precipitous inland rocks, and certainly the difference between this bird and a common blue flying tumbler is very little. Their color is identical, their size almost so. . . . In the west of Scotland, where fanciers keep and show common pigeons, the wild Blue Rock domesticated is the bird so called."

It is by no means certain that these wild pigeons are a true wild race. Considering the habits of the pigeon and its wide

distribution in England centuries ago, it seems certain that many, if not all, of the pigeons now found wild in the British Isles are descended from birds once domesticated. Rock Pigeons of the



FIG. 184. Flock of Drogon Pigeons¹

same type, however, are found in many other parts of the Old World and, whether wild or feral, are plainly all from the same original stock. The American Wild Pigeon, also called the Passenger Pigeon, which was once found in enormous flocks in eastern North America, is often erroneously mentioned as the ancestor of domestic pigeons. The Rock Pigeon and the Passenger Pigeon are of different species and are very different in appearance and habits. The Rock Pigeon is what is called a shelf builder.



FIG. 185. Flying Homer Pigeon¹



FIG. 186. Silver Runt Pigeon¹

It builds its nest on a ledge, or shelf, and will rarely even alight in a tree or a bush. The Passenger Pigeon is a wood pigeon, nesting and roosting in trees.

Distribution in ancient times. The pigeon was domesticated at a very early stage of civilization. Like the fowl, the duck, and the goose, it was well known to all civilized peoples of antiquity. To what extent the distribution of pigeons in domestication followed the early migrations

¹ Photograph from Elmer E. Rice, Boston, Massachusetts.

of the human race is not known. It is probable that pigeons were domesticated before the Aryan migrations began, and also that the domestic stock was sometimes taken by Aryan colonists to their new homes; but it is equally probable that at various times in the history of the earth people coming to new lands domesticated some of the wild rock pigeons which they found there.



FIG. 187. Swiss Mondaine Pigeon¹

of the Old World the making of improved varieties began thousands of years ago, and in some places peculiar types were developed which were little known elsewhere until modern times. The varieties of the pigeon are so numerous that it is practically impossible to make a complete list of them. At the large shows in this country, classes are

made for more than one hundred fifty named varieties,

in about forty breeds. In many of these breeds there are eight or ten principal color varieties, and an indefinite number of less popular varieties, specimens of which compete in a miscellaneous competition in what is called the "any other variety class." There are probably nearly three hundred varieties of pigeons bred in America and England. On the continent of Europe the number is very



FIG. 189. Blue-barred Homer¹



FIG. 188. Splashed Homer¹

much greater. The Triganica pigeon has one hundred fifty-two color varieties, and it is said that another variety in Germany,

¹ Photograph from Elmer E. Rice, Boston, Massachusetts.

not known in England and America, has one hundred thirty-eight color varieties. Where varieties are so numerous, many of the color differences are necessarily slight, and only those

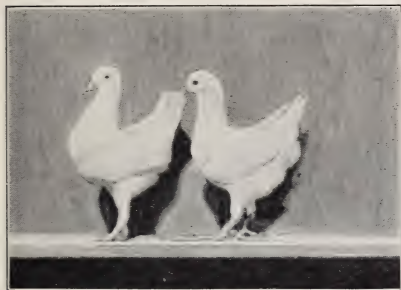


FIG. 190. White Hen Pigeons. (Photograph from Elmer E. Rice, Boston, Massachusetts)

who know them well can readily distinguish the different varieties at sight; others are bewildered when they attempt to do so. In this chapter only the most pronounced color varieties and the breeds of most interest to beginners will be described, but some of the most interesting of the others will be mentioned, to

illustrate the range of the improved types developed by fanciers.

The Carrier Pigeon. The homing instinct—that is, the faculty of finding the way home after wandering or being taken away from it—is found in animals of all kinds. In some kinds of animals it is much more highly developed than in others, and some animals of each kind have more of it than is usual with their species. It is well known that migratory birds usually return to the same localities season after season, and that certain pairs often return to the same vicinity year after



FIG. 191. Young Jacobin Pigeons. (Photograph from E. R. B. Chapman, Stoneham, Massachusetts)

year and build their nests in the same places. When this instinct is highly developed in a wild bird, its habit of returning to the same nest is of great interest to those who observe it, but it has

no particular value. In a domestic bird the homing instinct or habit is of service because the owner of a bird relies upon it to make the bird return always to the place which he has provided for it, instead of taking shelter elsewhere or remaining where nocturnal enemies will find it an easy prey. In the domestic land birds the instinct has no further use than this, but in pigeons which, while thoroughly domesticated, retain full power of flight, the development of the homing faculty makes it possible to

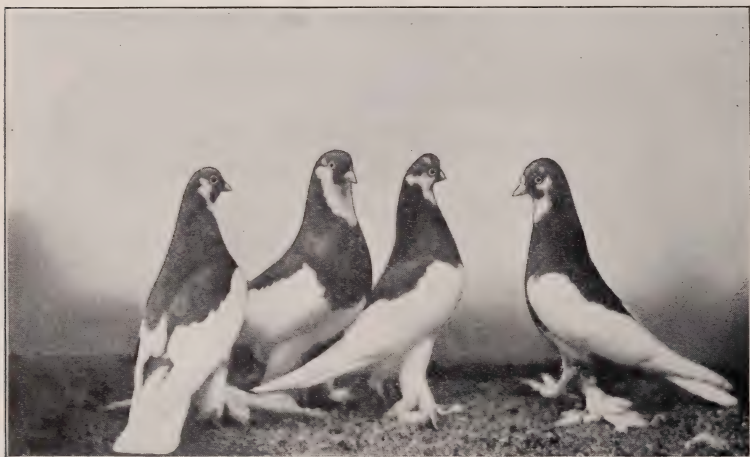


FIG. 192. Muffed Tumblers with "saddle" color pattern. (Photograph from E. R. B. Chapman, Stoneham, Massachusetts)

use them as a means of communication when it is necessary to transmit short letters with great dispatch.

It is known that pigeons were used as messengers in war about the beginning of the Christian Era. An Egyptian bas-relief of about 1350 B.C. shows pigeons being released from cages just as they are now released in flying matches. The homing instinct is so strong in the common pigeon that any one familiar with its habits may easily suppose that pigeons were used to carry messages almost as soon as men had devised means of communication by writing upon any material which

the birds could carry in their flight. There is reason to believe that in very ancient times pigeons were bred and trained especially for work of this kind in Egypt, Greece, and Rome.

The pigeon which in England and America now goes by the name of "Carrier Pigeon" is a type developed as a messenger pigeon in Persia and from that country distributed to many parts of the world. As bred in Asia it was larger and stronger



FIG. 193. Feeding pigeons on Boston Common. (Photograph from Elmer E. Rice, Boston, Massachusetts)

than the common pigeon, and had a cere, or convoluted membrane, around each eye and at the juncture of the head and the beak. It is thought that this type of Carrier may have been taken from Asia Minor to England at the time of the Crusades, but nothing definite is known of it in Great Britain until the seventeenth century. This old type of Carrier and several closely related varieties were used for messengers, and also in flying competitions, until the variety next described was developed. When the Carrier Pigeon was bred for carrying messages, no

attention was paid to its color. Pigeon fanciers who were not interested in pigeon flying, but liked the Carrier for its other characters, early developed many distinct color varieties and also gave special attention to the form and carriage of the bird and to the development of the ceres around the eyes and on the beak. The Carrier Pigeon is now bred only as an exhibition bird.

The Antwerp Homer. Beginning sometime early in the last century, breeders of flying pigeons at Antwerp, in Belgium, developed a race which soon became celebrated for superior development of the homing faculty and for great speed and endurance. This race was at first called the Antwerp Carrier.



FIG. 194. Flying Homer¹

When the invention of the telegraph made the services of pigeons as messengers on land unnecessary, pigeons that could fly long distances were still bred and trained for competitive flying matches. In these, as a rule, they carried no messages; the object was to see which bird would reach home first. So gradually the term "homer" was substituted

for "carrier," and the pigeons now called Homers, or Homing Pigeons, are the Antwerp Homing Pigeons. Good birds of this type are larger and stronger than the common pigeon, and have a bolder, more confident bearing and a more attractive carriage. They show their good breeding very plainly. Many of the pigeons called Homers are crosses or grades of the Antwerp Homer, and are not much better in any way than ordinary pigeons.

The true Homer is also the most popular type of pigeon for the production of squabs for market. Its great prolificacy, strong constitution, quick growth, and large size make it a favorite with squab growers. As bred for flying or for market, Homers are of various colors, and the color varieties are not distinct except

¹ Photograph from C. E. Twombly, Medford, Massachusetts.

as occasionally a breeder makes a specialty of producing birds of some particular color. Many pigeon fanciers breed Homers solely for exhibition. The Exhibition Homer has many distinct color varieties — Blue, Silver, Mealy, Blue Checker, Black Checker, Black, Red Checker, White, Yellow.

Tumbler and Tippler Pigeons. The flying powers of pigeons have been developed for other purposes as well as for traveling long distances. In rising or descending in flight a pigeon sometimes turns a somersault in the air. This trait has been developed in certain races so that many birds will perform the feat very often. These races are called Tumblers. They are



FIG. 195. Squab-breeding Homers. (Photograph from Elmer E. Rice, Boston, Massachusetts)

found all over Europe and Asia and in a few localities in America. The common Tumblers perform in the air, usually at some distance from the ground, the tumbling of individual birds being an occasional feature of the evolutions of a flock circling about in the vicinity of its home. From this common Tumbler more highly specialized types have been developed. The breeding of these types has become something of an art, and in some cases the sport of flying them has become a well-organized recreation.

By breeding together specimens which performed well when flying, Tumblers were finally produced in which the tumbling propensity was so exaggerated that they could not fly but, after

a few somersaults, alighted on their feet. These birds were called Inside Tumblers, or Parlor Tumblers, to distinguish them from the common Tumblers, which required more room for



FIG. 196. Clean-legged
Red Tumbler¹

their evolutions than any ordinary building afforded. Although they are incapable of flight, the Parlor Tumblers can rise a short distance before they fall. The Roller is a Tumbler which turns many somersaults so rapidly that each revolution of its body is made in a very small space. A high-flying Roller falls while rolling in the air. An Inside Roller turns over and over backward on the ground.

Breeders of common Tumblers do not give them liberty, but release them from their loft only when they wish to see the birds perform, and, by feeding them immediately upon their return, coax and train them to return to the loft soon after being released. A good performer is soon exhausted by tumbling, and is quite willing to return to the loft in a short time. But not all birds of Tumbler stock are good and persistent performers, and often birds that do not perform prefer liberty for a longer period to the food that is waiting for them in the loft. Birds have sometimes been compelled to remain in the air for a long



FIG. 197. Muffed, or Feather-legged, Tumblers¹

time. As a result of this treatment of poor Tumblers a type of Tumbler has been produced which will perform more or less when ascending or descending, but which, having risen to a

¹ Photograph from E. R. B. Chapman, Stoneham, Massachusetts.

high elevation, will remain for hours circling over its home and perhaps occasionally flying away and returning. Tumblers of



FIG. 198. English Owl Pigeon¹

this type can remain in the air for five or six hours. In flying them for sport the object is to see which flock will remain in the air longest. The tumbling habit was gradually bred out of the high-flying birds, and after a time many of them did not tumble at all. Such birds were then called Tipplers ("tipple" having in some English dialects the meaning of "tumble"). The modern Tippler Pigeon is a bird in which the tendency to

rise to a great height and remain there for a long time has been developed to the utmost, as the tendency to return home from great distances has been developed in the Flying Homer. Performing Tumblers and Tipplers are usually bred for performance without regard to color, and the colors in a flock of the same breeding may be, and nearly always are, various. Exhibition stocks of Tumblers and Tipplers are bred in many distinct color varieties.



FIG. 200. English Saddle Trumpeter Pigeon¹

Normally a pigeon has from twelve to sixteen of these feathers; in the ordinary Fantail the number has been increased to twenty-four or twenty-six. Many of the

The Fantail Pigeon. The Fantail Pigeon originated in India. The fan-shaped tail, from which this variety takes its name, was developed by selection to increase the number of the large, straight main tail feathers. Normally a pigeon has from twelve to six-



FIG. 199. English Red Trumpeter Pigeon¹

¹ Photograph from E. R. B. Chapman, Stoneham, Massachusetts.

specimens in which this character is highly developed have a much greater number of tail feathers. It is said that forty-two feathers have been counted in a tail. A tail in which there are



FIG. 201. White Runt Pigeon¹

so many feathers cannot be carried in the natural position ; it spreads, forming a major segment of a circle, and at the same time it is elevated until, in specimens with very full tails, the highest tail feathers stand nearly perpendicular. To balance the large tail carried in this position the Fantail has to carry its head very far back. This makes the breast very prominent. The bird cannot fly well, and when walking about it appears to be strutting to make a display of its

spectacular tail. Its appearance is in this respect deceptive, for it is a very modest bird and has difficulty in balancing itself in any other position. The Fantail is gentle and affectionate, and is the best of all pigeons for those who want birds for pets. It is bred in many color varieties. The White Fantail is the most popular, because it is the most showy and the easiest to produce with uniform color in a flock.

Pouter Pigeons. All pigeons have in some measure the power of inflating the crop with air. In the Pouter Pigeons this power has been developed and its exercise encouraged to such an extent that in many specimens the inflated crop is as large as all the rest of the bird. Pouters were introduced into England from Holland several hundred years ago. They were at first called Croppers. The common Pouter is a large pigeon with



FIG. 202. White Pouter Pigeon

¹ Photograph from Elmer E. Rice, Boston, Massachusetts.

long legs. It usually stands in a very erect position. There is a race of dwarf pigeons of this type, called Pigmy Pouters.

Other important types. One of the most attractive pigeons is the Jacobin, which has the feathers of the neck turned upward, forming a hood which sometimes almost conceals the head. The Turbit and Owl Pigeons are distinguished by a frill of feathers on the breast, and by the peculiar beak and face, which are very short. The Dragoon is a large, showy pigeon of the Carrier type. The Trumpeter is distinguished by a crest, which greatly obstructs its sight, as well as by the peculiar development of the voice, to which it owes its name. The Runt is a very large pigeon bred both for exhibition and for the table. Some squab growers prize it very highly; others say that the smaller and more prolific Homer is more profitable for squab breeding. The use of a term commonly applied to undersized, ill-developed creatures as the name of one of the largest pigeons is one



FIG. 203. Fowl-like, or Maltese Hen, Pigeons¹

of the curiosities of nomenclature. The explanation, however, is simple. In England in old times common pigeons were called runts. The pigeon now called the Runt was introduced into England from Spain, and was called by early writers on pigeons the Spanish Runt, meaning the common pigeon of Spain. With the disuse of the term "runt" to designate the common pigeon, the term "Spanish" was dropped from the designation of the improved breed, and it became simply the Runt. Besides the Runt just mentioned there is another large pigeon, once called the Leghorn Runt, which belongs to the class of Fowl-like, or Hen, Pigeons, so called because in shape they are strikingly like

¹ Photograph from Elmer E. Rice, Boston, Massachusetts.

fowls. The most familiar representative of this class is the Maltese Hen Pigeon.

History in domestication. The history of the pigeon in domestication presents some very interesting features. Its use as a messenger has been mentioned. From very early times



FIG. 204. Nun Pigeons¹

people of privileged classes took advantage of the habits of the pigeon to grow the birds for their own use at the expense of the community. The Assyrians and some other ancient peoples considered the pigeon sacred to certain of their deities. Sometimes all pigeons were so regarded; at other times and places only white pigeons were sacred, those of other colors being used by the common people.

In medieval times in England, the lord of a manor, when leasing farms to tenants, reserved the right to let his pigeons forage over them. As pigeons live mostly upon grains and seeds, caring little for green vegetation and insects, the newly planted fields of the farmer were the favorite feeding places of his landlord's pigeons. The landlords, being able to keep pigeons without other expense than that of providing shelter for them, built large dovecots



FIG. 205. German Frillback Pigeons¹

near the manor houses and kept their tables plentifully supplied with pigeons. At one time it was estimated that there were more than twenty thousand such dovecots in England. The

¹ Photograph from E. R. B. Chapman, Stoneham, Massachusetts.

destruction of crops by the occupants of these caused serious losses to the farmers and a great deal of trouble between them and their landlords. This form of protection for roving pigeons in agricultural districts was finally abandoned.

No doubt the selfishness of landlords was originally responsible for this method of protecting pigeons, but the government of the country at that time also had something to do with it. Pigeon manure is very rich in niter, which in those days the government had difficulty in procuring in such quantities as it needed for the manufacture of gunpowder; so it adopted the policy of regulating the construction of pigeon houses, prescribing the method of disposing of the droppings to conserve the niter in them and appointing official inspectors to see that its regulations were observed, and collectors to gather the pigeon manure. It was much easier to do this when large flocks were kept by landlords than when an equal number of the birds were kept in small flocks by the tenants.

Place in domestication. Although many farmers keep small flocks of pigeons, the pigeon in modern times is a city bird rather than a country bird. The strong flying types are all well adapted to an independent life in towns and cities, where, as has been stated, they often become a nuisance. This form of nuisance might be partly abated and perhaps prevented if city authorities would systematically and humanely exterminate the free flocks of common pigeons, and encourage citizens to breed improved varieties under proper control.

Pigeon culture does not afford as many or as good opportunities for profit as poultry culture does, but it is suited to conditions under which poultry do not thrive. A flock of pigeons may be permanently maintained by a city resident who has so little room for domestic birds that, if he kept poultry, he would have to renew his flock every year. A few pigeons may be kept by any one who can provide a nesting place for them where they will be safe from cats and rats. In this country the growing of

squabs has been widely exploited in recent years as a profitable commercial industry. Near large cities where the demand for squabs is good, squab growing on a large scale is sometimes successful. Elsewhere the small flock that can be cared for in the owner's spare time is likely to be more profitable.

The breeding of fancy pigeons is also almost wholly a spare-time occupation. The demand for fancy pigeons is small in comparison with the demand for fancy poultry, and a pigeon fancier's trade rarely grows so large that he can give his attention to it exclusively. In Europe the breeding of pigeons for exhibition and sport is more popular than in America, but the interest is growing rapidly in this country.

CHAPTER XVIII

MANAGEMENT OF PIGEONS

Almost every child knows something of the lives of the common pigeons that are seen at large in both city and country. Some flocks have owners who take a slight interest in them and make rude provisions for their safety and comfort. Nearly all the country flocks, and many of the city flocks, are in this class. But there are in all large cities, and in some smaller places, many flocks of pigeons which no one claims to own. They build their nests in high cupolas, in the belfries of churches, on sheltered ledges under the cornices or other projections of high buildings, and in all sorts of places from which they cannot be easily dislodged. The streets and areas of a great city afford daily food sufficient for vast numbers of birds. The principal part of this is fresh oats scattered by thousands of horses as they take their noon meal from pails or nose bags, and oats that, passing through the horses undigested, are mixed with the dust and dirt of the street. Very large quantities of food also fall on the streets from torn bags or broken boxes as cereal products are carted from place to

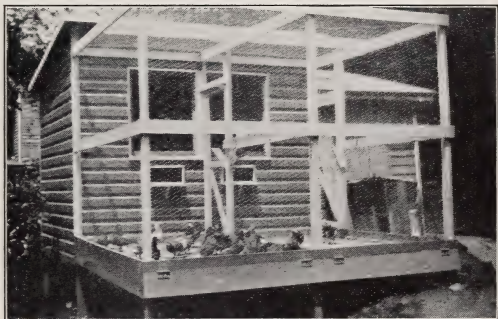


FIG. 206. Small pigeon house and fly¹

¹ The photographs for illustrations in this chapter, when not credited to others, are from Elmer E. Rice, Boston, Massachusetts.

place and handled in transportation. Then there are the crumbs and remnants of food thrown from windows by innumerable people who carry their lunches when they go to their work; and besides these a great deal of waste food from the occupants of tenements, as well as from many hotel and restaurant kitchens. Much of this is thrown out at random, but often, when pigeons begin to frequent places where food supplies are regular, the people there take an interest in the birds and throw out more than they did before. From all these various sources an abundance of food is

available for birds that forage on the city streets:

The pigeons do their part in saving this waste food, but the people derive little benefit from the saving, because so many pigeons are not kept under control, where their produce may be

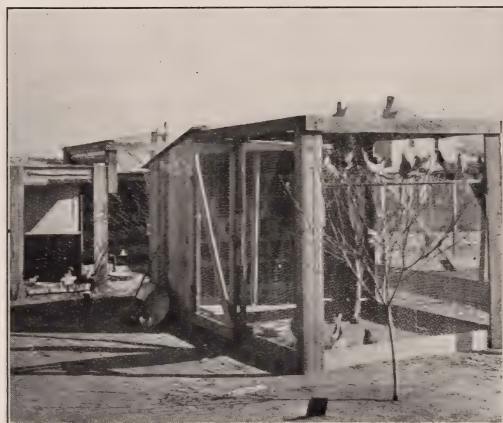


FIG. 207. House and fly for a small flock

taken and used when it is ready. Good management of pigeons consists in keeping them so that the owner gets all the benefits of ownership. Good management in the large sense requires that all pigeons shall be owned by some one who is responsible for them, and who keeps them under full control or under partial control, as the circumstances in each case require.

Size of flock. A flock of breeding pigeons may contain as many pairs as can nest in the place where they are kept. Most pigeon keepers prefer lofts about 12 or 14 feet square, because in larger spaces it is harder to catch the birds when they must be handled, and in many ways the very large flock makes extra

trouble for the attendant. A place with a floor area of from 150 to 200 square feet will accommodate from fifty to sixty pairs of breeding pigeons. Except when undertaking squab breeding on a large scale, pigeon keepers usually begin with a small number and keep most of the increase until the full capacity of the loft is used.

Quarters for pigeons. A pair of pigeons may be kept in a coop, box, or cage about 3 feet square, and 2 or 3 feet high. A cage 4 or 5 feet high, or one as high as the room in which it is placed, is still better, because it will allow the birds a little room to use their wings. If such a cage has a few perches at various heights, the pigeons will not seem to miss their liberty. Such close confinement, however, is not recommended

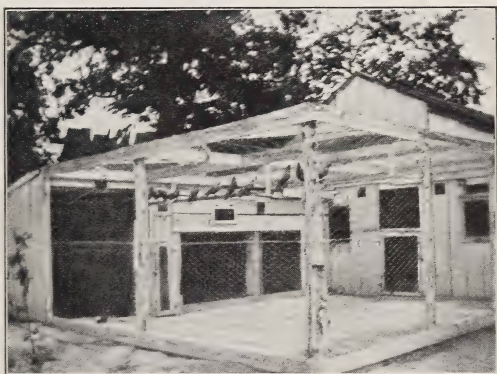


FIG. 208. Small barn and shed arranged for pigeon keeping

except for those who cannot provide larger quarters, or who merely wish to keep one or two pair a short time for observation. A house about 6 feet square makes a convenient size for a small breeding flock of pigeons. In a place of that size eight or ten pairs may be kept. Attached to it there should be a wire-inclosed fly, as pigeon keepers call the outdoor compartment for pigeons. The size of the fly can be adjusted to suit the conditions and the available space. The larger the fly the better the pigeons will like it, but even a very small place where they can be much in the open air and lie and sun themselves is better than constant confinement indoors, which makes them anemic and greatly reduces their vitality.

Where the space for pigeons is very limited and there is room for only one small loft and fly, breeding operations are closely restricted. Most pigeon fanciers want at least two lofts of this size—one for the breeding birds, the other for the young birds that no longer need the care of their parents. With such facilities the work in the breeding loft goes on better, and promising young birds can be kept until they are well matured and the breeder can tell whether it is advisable to keep some

of these and dispose of a part of the old ones.

To provide for larger numbers of birds, either more lofts or larger lofts may be made. A breeder of fancy pigeons usually prefers many small compartments. A breeder of squabs for market makes each compartment

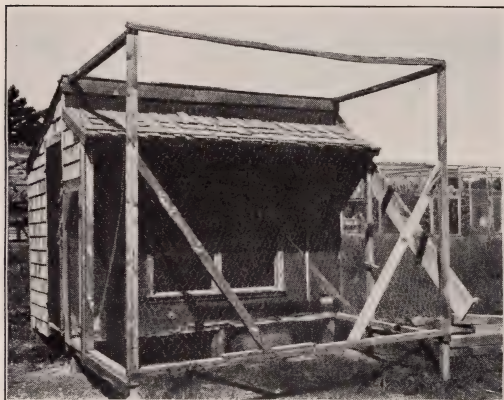


FIG. 209. Old poultry house arranged for pigeons. (Photograph from Dr. J. G. Robinson, Pembroke, Massachusetts)

as large as is convenient and builds as many as he has room for.

Buildings for pigeons are constructed on the same plans as buildings for fowls. The furnishings of the pigeon loft are different from those of the poultry house, and of course the fly is always completely inclosed. Upper floors or lofts of buildings are used for pigeons to much better advantage than for poultry, but where there is room it is more satisfactory to have all quarters for pigeons on the ground floor.

As the young pigeons remain in the nest and are fed by the parents until they are almost full-grown, each pair of old pigeons must have their own nesting place. As has been stated,

the domestic pigeon is a shelf builder. So in arranging for nests the pigeon keeper builds shelves 10 or 12 inches apart, and divides these into compartments about 12 inches wide, thus forming pigeonholes. Because a hen pigeon often lays again and begins to incubate before a pair of young are ready to leave the nest, it is usual to arrange the pigeonholes in pairs. This is sometimes done by omitting alternate dividing boards, making each pigeonhole twice the size required, so that a nest can



FIG. 210. City back-yard squab plant

be made in each corner. Some people prefer to have single pigeonholes and to arrange them in double sections by making each alternate perpendicular board project several inches beyond the front edge of the horizontal shelf. When this is done, a pair of pigeons in possession of one side of a double section will usually claim the entire section and prevent others from entering it even when they are themselves using only one side.

For indoor perches for pigeons individual perches shaped like an inverted V are most used. These are attached to the

wall, one above another, about 12 or 14 inches apart. The pigeons rest on the upper edge of the perch, and the sloping sides prevent their plumage from being soiled by birds roosting above them. In the outdoor flies running boards are placed along the sides to make exercising and resting places for the birds, for they usually prefer a shelf of this kind to the ground. Long perches are also placed in the fly when the running boards



FIG. 211. Running boards in pigeon fly. (Photograph from Springer Brothers, Bridgeton, New Jersey)

do not give room for all the pigeons in the flock. Out of doors the birds get along very well on long perches, but in the house each wants a separate perch. Feed hoppers like those used for fowls are used in pigeon houses. Drinking vessels for pigeons should be of the fountain type, exposing only a small surface of water, because if the vessel is open the birds will bathe in it. For the bath any circular vessel with a depth of 4 or 5 inches and a diameter of 18 inches or over may be used.

Ventilation and cleanliness. The ventilation of a pigeon house is managed in the same way as that of a poultry house, by adjusting the openings in the front. Most kinds of pigeons are very rugged and, when fully feathered, can stand a great deal of cold. When a house is open in winter, some of the young, unfledged squabs may be chilled and die from exposure, but breeders agree that, on the whole, it is better to keep the windows or other openings for ventilation partly open at all times. While this causes some loss of the weaker squabs, it keeps the old birds in much better condition than when the house is tightly closed.

To keep the loft looking clean and neat the droppings should be removed from the floor, and from all shelves that can be cleaned without disturbing breed-

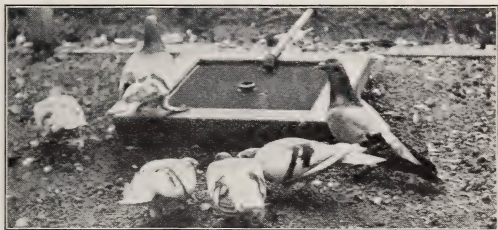


FIG. 212. Constant water supply for pigeons

ing birds, at least once a week. Many pigeon keepers clean the houses oftener than that, but if the ventilation is good and the droppings are dry and firm, a house may go uncleaned for weeks or months without detriment to the birds. It is customary to keep the floor of the pigeon loft thinly covered with fine gravel, coarse sand, sawdust, or chaff. To prevent the wind from the pigeons' wings from blowing this from the middle to the sides of the floor, a small box is placed in the middle of the floor. Whenever it is possible, the bath pan is placed outdoors, because in taking a bath pigeons splash the water a great deal, and if they are given the bath indoors, they will make a nasty mess of the house floor unless it is perfectly clean. The bath need not be given oftener than once or twice a week. In bad weather it is better to let them go without a bath than to have them take one and get chilled before their feathers dry.

Handling pigeons. When a few pigeons in a small loft get a great deal of attention, they usually become very tame and allow themselves to be caught at any time. For catching pigeons that are shy, pigeon keepers use a net, called a landing net, such as is used by fishermen. A pigeon is held securely in the hand by grasping it so that the breast of the bird lies in the palm and one wing is held against the side by the thumb and the other by the fingers. A pigeon may also be carried by the tips of the wings by bringing them together over the back and letting the bird hang by them.

Mating pigeons. The beginner's first serious difficulty in breeding pigeons is to get the birds in his loft all mated and each



FIG. 213. Small pigeon house and fly

pair attending to the work of hatching and rearing its young. As has been said, the sexes cannot always be identified by appearance. Most of the pigeons sold for breeding

are young birds that have not yet mated. Some breeders and dealers are very expert in selecting males and females, but all make some mistakes, and the average person makes a great many of them. There are two ways of selling pigeons. The most common way is to sell the desired number of birds, the seller selecting, according to his best judgment, equal numbers of males and females, with the understanding that if, when the birds mate, there is an excess of one sex, he will make a suitable exchange. The other way is to sell the number of pairs desired, guaranteeing them as mated pairs—which means that the pairs are all known to be properly mated. The advantage of buying guaranteed mated pairs is that the question of mating requires no further attention at the outset, but the prices for them are

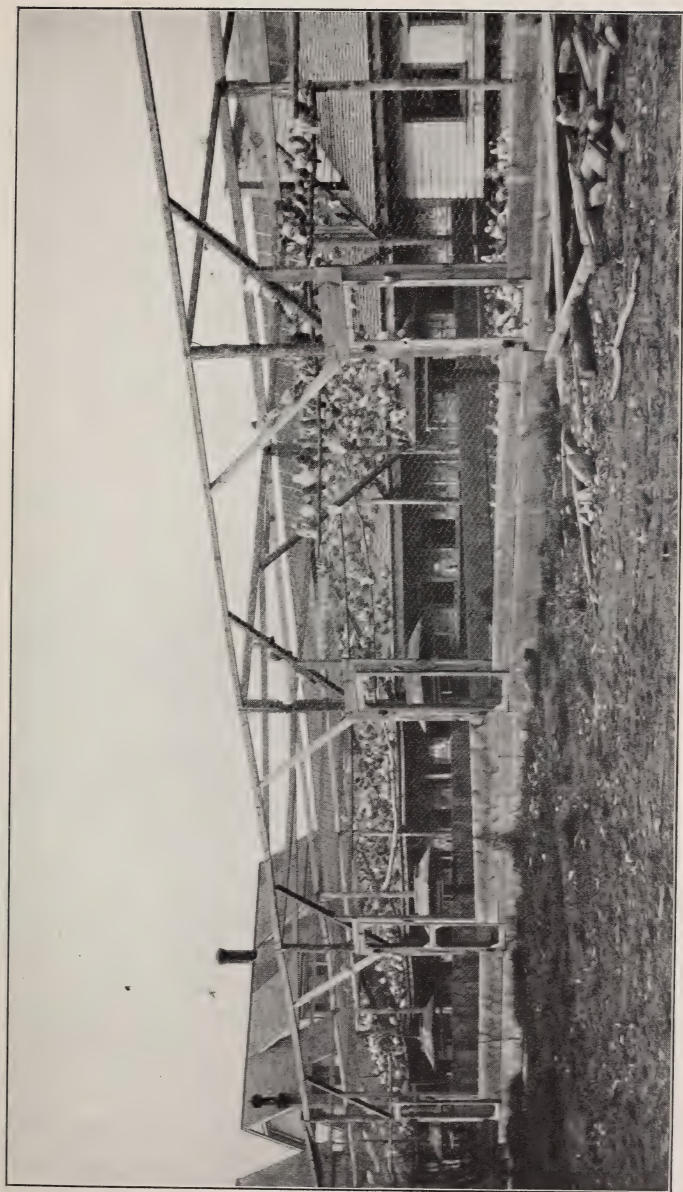


FIG. 214. Large squab plant. (Photograph from Dr. J. G. Robinson, Pembroke, Massachusetts)

so much higher than for those not known to be mated, that most beginners buy on the other plan.

Where the flock is small and the birds are to be allowed to select their own mates, all that is necessary is to watch them closely until all are mated or it is evident that there is a surplus of one sex. Surplus males will quarrel persistently with the other males and endeavor to coax their mates away from them. The unmated males must be provided with mates or removed from the loft. Unmated females are not so readily noticed except when there are only a few birds in the loft, but by close watching they will soon be found.

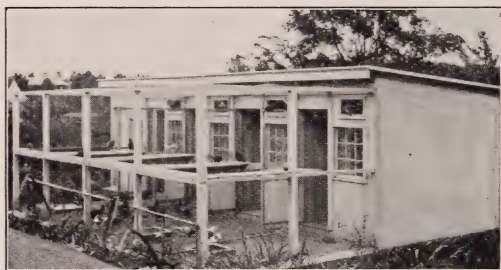


FIG. 215. Neat pigeon house and fly

When a start is to be made with quite a large number of unmated birds, the best plan is to put the flock first in a different apartment from that in which they are to be kept permanently, and, as each pair mate and begin to build their nest, remove them to their permanent quarters.

When it is desired to mate a particular male and female, the best way is to place them one in each side of a small coop with a wire partition across the middle. This coop should be put where they cannot see other pigeons. Sometimes one of the birds shows a decided antipathy to the other. In such a case it is, as a rule, useless to continue efforts to induce them to pair. In most cases, however, the birds will soon show mutual affection. When this stage is reached, they may be taken to the loft and released. Short coarse straw or fine twigs should be placed where pigeons that are building nests can take what they want. No nest box or pan is really needed, but many pigeon keepers use a nest bowl, called a nappy, of earthenware or wood fiber.

Feeding. The food of pigeons consists almost wholly of grains and seeds. The principal grains used in America are wheat and corn (usually cracked corn). Field peas are also used quite extensively. While pigeons will eat the same kinds of ground-grain products as are fed to poultry, pigeon keepers rarely use such foods. They prefer to give a variety of hard grains and seeds. Those who keep large stocks of pigeons often buy separately the feeds which they use, and mix the grains to suit themselves, or feed them in such alternation as seems desirable. People who keep only a few pairs of pigeons usually find it more satisfactory to buy the feed mixtures sold by dealers in pigeons' supplies. As a rule, old grain and seed that are very dry and hard are best for pigeons, and especially for exhibition and breeding stock.

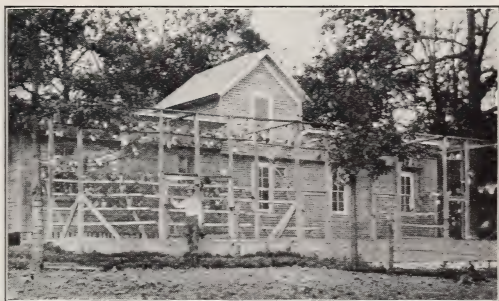


FIG. 216. An attractive squab plant

The most common practice is to give the feed in hoppers, keeping a supply always before the birds. This is done principally because it is the most convenient way, particularly for those who are away from home a great deal. For them hopper feeding is really necessary, but pigeon fanciers seem to agree that when the birds can be fed by throwing on the floor of the loft or the fly, two or three times a day, just about the quantity of food that they need for a meal, they do better and the cost of food is less than by the hopper method. Unlike poultry, pigeons require considerable quantities of salt. The common practice is to keep it before them in the form of lumps of rock salt, one large lump being enough for the birds in a loft of ordinary size. Oyster shell should also be supplied.

How pigeons rear their young. After a pair of pigeons have completed their nest, the male seems to come at once to the



FIG. 217. Homer squabs four weeks old

conclusion that home duties demand his mate's constant attention. At the nest he struts about, cooing and coaxing, entering the nest himself, then leaving it and plainly showing his wish that she should take the nest. If she goes away from the nest, he follows her with his head high and his neck inflated. His cooing turns to scolding. He pecks at her and will not give her a moment's peace until she returns to the nest. The hen lays one egg and, after laying it, spends most of her time standing on the nest until the second or third day after, when she lays another egg and immediately begins to sit. She seems to know that if she sat on the first egg before laying the other, one squab would hatch two or three days earlier than the other, and the second squab, being smaller and weaker, would have a hard time. The work of incubation is done mostly by the hen, the cock taking only a minor part. For about an hour in the middle of the morning and again in the middle of the afternoon he relieves her on the nest, giving her a chance to eat, drink,

conclusion that home duties demand his mate's constant attention. At the nest he struts about, cooing and coaxing, entering the nest himself, then leaving it and plainly showing his wish that she should take the nest. If she goes away from the nest, he follows her with his head high and his neck inflated. His cooing turns to scolding. He pecks at her



FIG. 218. Carneaux squabs four weeks old

and take some exercise. Counting from the time the last egg was laid, the period of incubation is sixteen or seventeen days.

Young squabs, like all other young birds that are naked when hatched, are ugly little things. They have apparently insatiable appetites, and their mouths seem to be always open. They are fed by the parents with pigeon milk, which is simply the usual food of the old birds softened in the crop. The pigeon has the power of disgorging the contents of the crop at will, and feeds its young by forcing food from its crop into their mouths. When they are well fed, the squabs grow very fast.

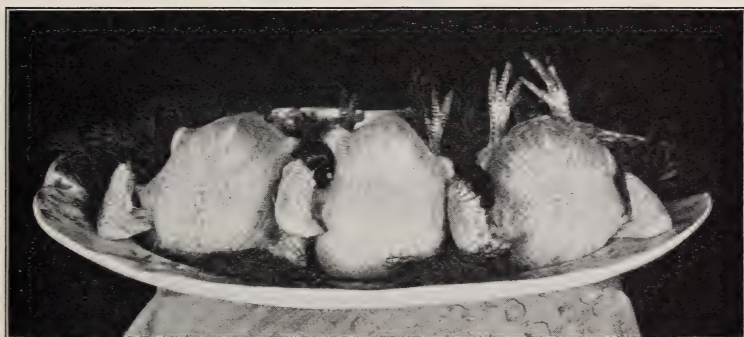


FIG. 219. Dressed squabs. (Photograph from Dr. J. G. Robinson, Pembroke, Massachusetts)

Young Homers four weeks old often weigh from three quarters of a pound to a pound, or even more, and are ready for market. Many of the fancy varieties of pigeons are hard to rear, because the abnormal structure of the beak or the interference of peculiar feather characters prevent the old ones from feeding their young properly. All the breeds described in detail in the preceding chapter are known as good feeders.

Pigeons will breed nearly the year round, stopping only while molting, but in cold climates many young birds die in the nests in winter. Those who are breeding for market take this as one of the risks of their business. If only half of the squabs are

reared in winter, the profits may be as great as when the actual results are much better, because in winter the prices are much higher than at the seasons when squabs are most easily produced. Fanciers do not usually allow their pigeons to breed during the coldest winter months, but take the eggs from the nests or keep the sexes separate until spring approaches. The object of the fancier is to produce specimens having the finest possible development of form and color. He cannot do this successfully under conditions that cause heavy losses. The birds may grow under such conditions but will not have the superior quality that he desires, and so he finds it more profitable to concentrate all his attention upon the birds that he can produce when the weather is most favorable.

CHAPTER XIX

CANARIES

The canary is the only common cage bird. There are about fifty kinds of birds that make desirable pets, but very few of them will breed in small cages, and many will not breed in confinement even when kept in large aviaries. In the United States the number of kinds of cage birds is restricted by state laws which prohibit keeping native song birds in captivity. Such laws are necessary to preserve the birds. Before these laws were passed, great numbers of song birds were trapped every year to send to Europe, where the keeping of cage birds as pets is more popular than in America. Song birds from other parts of the world may be kept in this country, but most of them are so scarce and expensive that few people would buy them even if the canary were not a more satisfactory pet.

Description. The common domestic canary is a small bird, about five inches in length, very lively and sprightly in manner, and in color yellow or a greenish gray and yellow. The male and female are so much alike that the sex cannot be positively determined by the appearance. Although it often happens that the male is more slender in form and brighter in color, the voice is a better index of sex and, in mature birds of good singing stock, is very reliable. The male is the singer. The female also has a singing voice, but it is so inferior in quality to that of the male that few people care for it.

Origin. The domestic canary belongs to the finch family and is found wild in the Canary Islands (from which it takes its name) and in a number of other islands in that part of the world. The color of the wild birds is described, by some who

have seen them, as greenish-gray, changing to a greenish-yellow on the breast and under parts. Other observers describe the wild birds of some localities as brownish.



FIG. 220. Tricolor Canary¹

sailors left the ship, they opened the cages containing the canaries. The birds escaped to the Island of Elba and there became established in the wild state. From this colony of canaries birds were captured and distributed to all parts of Europe and America, their superior song powers and adaptability to domestication making



FIG. 222. Yorkshire Canary

The canary was introduced into Europe about four hundred years ago. As the story goes, a ship with a cargo from the Canary Islands, carrying several thousand canaries, which the traders thought might be sold in Europe, was wrecked off the coast of Italy early in the sixteenth century. Before the



FIG. 221. Norwich Canary with hood

them popular wherever they became known.

The wild bird known in America as the wild canary is the American Goldfinch. It belongs to the same family as the canary but is of a different species. It is of no value as a singer.

Improvement in domestication. Nearly all the varieties of the canary were developed before the eighteenth century. The German canary fanciers turned their attention to developing the song of the bird, the Belgian and British fanciers to making and perfecting shape and color varieties. In Germany the celebrated Harz Mountain Canaries were produced. These are simply common

¹ The illustrations in this chapter are from "Our Domestic Animals," by Charles W. Burkett.

canaries carefully bred and trained for singing. But their excellence as singers is not due to breeding and training alone; the climate of the Harz Mountain region seems to be peculiarly



FIG. 223. Belgian
Canary

suitied to the development of canaries with beautiful voices. The finest Harz Mountain Canaries are produced at St. Andreasberg, a health resort noted for its pure and bracing air. The St. Andreasberg Roller is a canary trained to sing with a peculiar rolling note.

Among fancy types of canaries the most interesting are the Norwich Canary, which is larger than the singing canaries and has reddish-yellow plumage; the Manchester Coppy, a yellow canary almost as large as a small pigeon; the Lizard Canaries (Silver and Golden), which have spangled markings on the back; the London Fancy Canary, which has an orange body with black wings and tail; and the Belgian Canary, a malformed type in which the head appears to grow out of the breast instead of being carried above the shoulders.

Place in domestication. Most people who have canaries keep them for pets, and have only a few. In perhaps the greater number of cases a single bird — a singer — satisfies the canary lover. A few of those who keep canaries as pets also breed them for sale. Occasionally a canary fancier devotes a room in his house entirely to his birds and, when breeding on such a scale, has a great many to sell. The commercial side of canary breed-



FIG. 224. English
Flatheaded Canary

ing, however, is usually subordinate, except in the Harz Mountain district, where the breeding and training of singing canaries is a very important cottage industry. Canaries from this district are sold all over the civilized world.

MANAGEMENT OF CANARIES

Cages. The common wire bird cages used for one or two canaries are so well known that no description of them is necessary. For larger numbers larger cages must be provided. Large cages cannot always be obtained at stores which sell the small ones, but they may be obtained from bird stores in the large cities, or made to order by a local mechanic. Indeed, any clever boy who has learned to use tools can make one at very little cost. While the small cages are usually made all of metal, the large ones are commonly made with wooden frames. A small cage has a removable bottom. A large cage must have two bottoms — the outer one fixed, the inner one in the form of a movable drawer. A metal drawer is easier to keep clean than a wooden one.

Position of the cage. The cage in an ordinary room should be hung where its occupants will be comfortable and safe. The greatest foe of the domestic canary is the house cat. Some cats can be trained to let canaries alone, but very few can be trusted to make no attempt to get a canary when left alone in a room with it. When canaries and cats are kept in the same house, the cage should hang in a place from which cats can be excluded when they cannot be watched. The comfort of the bird will often require that the position of the cage be changed once or oftener during the day, according to the season or to some particular condition. Thus, a sunny window may be very pleasant at some times and too warm at others, or a bird may tire of being constantly in the same place. The bird keeper has to learn to know, by observing the actions of birds, when they are comfortable and contented, and must use judgment in placing the cage to suit them.

Feeding. Canaries live mostly on ripe seeds, but they are also very fond of the leaves, flowers, and green seeds of many common plants. Being such small birds, they eat only small seeds. The seeds most used as food for canaries are hempseed, flaxseed,

rapeseed, and canary seed, which is the seed of the canary grass, a plant indigenous to the Canary Islands. These are often sold mixed under the trade name of "birdseed." Many canary fanciers think that it is better to feed the seeds separately, or to make the mixtures themselves, so that they can know just what the birds eat, and can judge whether any trouble which may arise is due to a wrong diet. Rapeseed and canary seed are considered the best and safest feed for canaries. They may be mixed in equal parts and kept before the birds at all times. Canaries like hempseed better than anything else, but it is so rich that, if fed heavily, it is injurious. When a mixture of seeds containing hempseed is placed in the feed cup, canaries will pick out and scatter and waste the other seeds, to get the hempseed. For this reason it is often left out of the mixture and given occasionally, a few grains at a time.

Canaries are very fond of lettuce, chickweed, and plantain. They also like the green seeds of many grasses. These things may be given to them by fastening the leaves or stalks between the wires of the cage where the birds can reach them easily. A piece of cuttlefish bone should be placed where the birds can eat some whenever they want it. Cuttle bone furnishes them with salt and lime.

Care. Canaries should have regular attention. Aside from having the position of the cage changed when necessary, they usually require attention only once a day. This should be at a regular hour, preferably in the morning. The cage should be placed on a table or stand, and the bottom removed, that it may be thoroughly cleaned. The best way is to wash it. While the bottom of the cage is being cleaned the cage with the bird in it rests upon the table. This is the best time to give the bird its bath. A shallow pan or dish containing about an inch of water is placed on the table under the bottomless cage. Some birds splash so vigorously that the bath must be given in a room containing nothing that would be damaged by the drops of water which they scatter. Some seem to understand that the harder

they splash the more trouble they make, and to take delight in wetting everything about them.

When the bird has had its bath, the cage should be wiped dry, the bottom replaced, the drinking cup rinsed and refilled, and the seed cup filled. If a bird is very tame and can be easily caught, it may be let out of the cage for its bath and for a little exercise. Many canaries will return voluntarily to their cages after bathing and flying around the room a few times. Canary fanciers frequently allow their birds the freedom of the room for hours at a time. Whenever this is done, special care must be taken that no unexpected opening of a door allows the bird to escape from the room. Neglect of this point often leads to the loss of a valued bird.

Breeding. The breeding season for canaries is from February until May or June. The cage for a breeding pair should be a little larger than that used for a single bird, and should be firmly attached to the wall instead of hanging where it can swing. The nest is usually a small wire basket. For nest material cotton batting and cow's hair or deer's hair are used. Deer's hair may be obtained at bird stores. These materials are placed in the cage and the birds use what they want. The hen lays from four to six eggs. The period of incubation is two weeks. During the breeding season the birds should be fed, in addition to the usual supply of seed, a little grated hard-boiled egg with cracker or bread crumbs. They also need a supply of fine oyster shells. By the time the young are three weeks old they are able to leave the nest and to feed themselves. They should then be removed to a separate cage.

CHAPTER XX

DISTRIBUTION OF MARKET PRODUCTS

Producers, consumers, and middlemen. The preceding chapters have treated of the characters and the uses of domestic birds, and of the methods of producing them. In this chapter we shall consider matters relating to the distribution of such of their products as are staple articles of commerce. There are very few subjects of general interest that are as widely misunderstood as some phases of the distribution of market eggs and poultry. Every one uses these products; many millions of people produce them in small quantities; but the consumers who are not producers live mostly in cities remote from the farming sections which have great surpluses of eggs and poultry to send to the cities, and so the work of distributing these products is done principally by traders, or middlemen.

The modern developments of poultry culture have been in a very large measure due to middlemen and could not continue without them. In a large and highly organized population middlemen in many different capacities perform the services which in primitive or small communities may be performed by either the producer or the consumer. Consumers and producers are apt to think that the middlemen get more than their fair share of the profits on the articles that they buy and sell. The true situation and the exact relations of producers, middlemen, and consumers of poultry products are easily understood if we study the development of the existing methods of distribution from the beginning.

How the middleman enters local trade. Suppose that a farmer brings to town 30 dozen eggs; that the storekeeper will allow him 20 cents a dozen for them; and that by peddling them from

house to house he can sell them for 25 cents a dozen: how much will he make by selling them directly to the consumers?

As an arithmetical example, considering only the factors which appear in the statement, this is a very simple problem. It is easy to compute that by selling the eggs from house to house the farmer will make \$1.50. But the farmer's practical problem in disposing of his eggs has some very important factors which do not appear in a simple arithmetical problem. Unless he had regular customers for his eggs, he would probably have to call at fifty or sixty houses to sell them. He might have to call at a great many more, and then might not succeed in selling them all. He would find that it was of little use to try to sell eggs to families that had not engaged them in advance, unless he called very early in the morning, before they had ordered eggs from some one else. If he succeeded in selling all the eggs, he would still have to consider whether it paid him better to spend his time, and that of his team, in selling the eggs than in working on the farm. Most farmers find that they cannot afford to peddle produce themselves, and unless some other member of the family can do it without interfering with important farm work, they sell such products as poultry, butter, and eggs to the storekeepers.

Now take the consumer's side of the case. The ordinary family uses only 2 or 3 dozen eggs a week. If the eggs can be bought at the store for 25 cents a dozen, and at a farm for 15 cents a dozen, there is an apparent saving of 20 or 30 cents by purchasing them at the farm. But in most cases it would cost the buyer more than 20 or 30 cents to go to the farm and get the eggs, and so he goes to the store for them.

The storekeeper is the middleman, really serving both producer and consumer. Every one can see this clearly in cases where there is only one middleman.

Additional middlemen. If the farmers trading at a country store bring to it more eggs than the people in the town will buy, the storekeeper must either sell them elsewhere or refuse

to take them. If possible, he will find a market for the surplus, usually by shipping them to the nearest large city. But he does not send them direct to consumers, for he could not deal with them any better than the farmers could with the people in his town. He may send them to a storekeeper in the city, but he is more likely to send them to some one who makes a business of receiving eggs from country collectors and selling them at wholesale wherever there is a demand for them. If the receipts



FIG. 225. Unloading coops of poultry at a receiving warehouse. (Photograph from the Bureau of Chemistry, United States Department of Agriculture)

in a city exceed the local requirements, the surplus will be sent to one of the great cities which are the principal receiving centers for produce of all kinds. The large receivers in the great cities distribute the eggs to retailers in the cities and also to jobbers and retailers in smaller cities where local supplies are inadequate.

Thus between the producer and the consumer there may be as many as six or seven middlemen who in turn handle the eggs. At first thought it seems that so many middlemen are not

necessary. But it is not a question of numbers ; it is a question of conditions. The number depends more or less upon whether the middleman at any stage finds it more advantageous to deal with one next to him in the general series or to pass one or more and deal with another farther away. In the United States prices of eggs are finally determined by the demand and supply in the large cities of the East ; the prices at other points are usually the prices in these cities, minus the cost of transportation and handling. In periods of scarcity, however, there is a tendency to uniformity of prices in all large cities.

The movements of poultry to market are made in much the same way as the movement of eggs. As a rule the same people handle both.

How the demand for poultry products stimulates production.

In the preceding sections it was assumed, for the purpose of showing clearly the relation of the middleman to both the producer and the consumer, that the movement of these articles from the country producer to the city buyer came about as the result of the existence of a surplus in farming districts. As a matter of fact the movement is produced by the demand in localities which do not produce their own supplies. One effect of the increase of population in cities is to cause farmers near the cities to grow more poultry and sometimes to establish special poultry farms. But as grain and labor cost more near the cities, the poultry and eggs produced near them must be sold at high prices. If the city people were dependent upon these local supplies, only the rich could afford them.

As this is true of all perishable food articles, as well as of poultry products, the growth of cities was restricted as long as there was no means of bringing provisions quickly from places where they could be produced at low cost. When steam railroads were built, this restriction on the growth of cities was partly removed. Many cities then began to grow very fast, and the demands of their population for cheap food led city dealers in

provisions to look for supplies in the towns and farms along the railroads. Many such dealers had before collected provisions by wagon as far from the city as was practicable. These men could now greatly extend their routes, because, having collected a wagon-load, they could take it to the most convenient railway station, ship it by rail to the city, and go on collecting, instead of spending a day or more in delivering their load in the city. Very soon after railroads were first built, many farmers began to produce more



FIG. 226. Fattening chickens in crates at a poultry buyer's warehouse.¹ (Photograph from the Bureau of Chemistry, United States Department of Agriculture)

poultry and eggs and to ship them directly to the best city market that they could find. As the demand for their produce was usually much greater than could be supplied from their own farms, such farmers often began to buy from their neighbors, thus becoming middlemen as well as producers. In many cases such men would after a time find it to their advantage to move their headquarters to the city, and would ultimately build up a very large business.

¹ If the farmer sells his chickens without fattening, the buyer can fatten them in this way and so make an extra profit.

In nearly all farming sections, even those most remote from city markets, there is a short period in the spring when there is a large surplus of eggs and sometimes a period in the fall when there is more poultry ready for market than can be sold; but the people in those places rarely make any effort to increase their production, and to extend the seasons when they have more than enough for themselves, until they have good facilities for shipping eggs and poultry and the demands from outside cause a marked increase in the local prices of these products.



FIG. 227. Driving turkeys to market. (Photograph from Bureau of Chemistry, United States Department of Agriculture)

So from the city and the country, almost simultaneously, but with the demand from the city most active and pressing, the modern system of collecting and distributing poultry products has grown. At first poultry products were nearly all handled by men who dealt in all kinds of country produce. As the business increased, many firms gave their attention exclusively to poultry products. Then, when creameries were established in many places, the creamery was found a convenient place for the collection of eggs. The large packing houses which handle

other kinds of meat also entered this field and became a very important factor in the development of poultry culture in the West.

In the collection and distribution of poultry products the various agencies mentioned form a great many different kinds of combinations. The arrangements vary according to many different conditions. From first to last every one who handles an article is trying to make all he can out of it, but most of the



FIG. 228. A big drive of turkeys arriving at a killing house. (Photograph from Bureau of Chemistry, United States Department of Agriculture)

middlemen deal fairly both in buying and in selling. Indeed, people cannot continue long in any legitimate business unless they are honest. As we shall see, middlemen are in a position where they are often blamed without just cause, and often have to take much greater risks than either producers or consumers.

Losses in distribution. It has been said that the general tendency is to reduce as far as possible the number of middlemen concerned in the distribution of poultry products. This tendency often goes too far and overreaches its purpose of economy. The efforts of producers and country collectors to

deal directly with consumers and retailers in the large cities often give them less profit than would be obtained by selling through the regular channels of the trade. The reason for this is that most producers and a majority of country collectors do not prepare and pack their poultry and eggs so that they will reach those to whom they are consigned in good condition and bring the prices which the shippers expected to realize. The losses



FIG. 229. Candling eggs.¹ (Photograph from Bureau of Chemistry, United States Department of Agriculture)

due to improper handling of eggs and poultry by producers and small collectors are enormous, undoubtedly amounting to more than \$100,000,000 a year in the United States.

To place eggs and poultry in the hands of consumers in strictly first-class condition, they must be handled with great care at every stage of preparation and distribution. Eggs must be gathered while perfectly fresh, kept in a cool place where no bad odors will reach them, and protected from heat and frost, as well

¹The man is posing for the photograph. When he works, the room must be dark except for the covered light used in candling.

as from breakage, when being moved from place to place. If the producer is careless about any of these points, many of his eggs will be tainted or stale or beginning to rot when they are only a few days old, and though he may call them fresh eggs and try to sell them as such, he will not get the highest price for them. The small collectors are also likely to be careless in handling eggs, and to ship them to receivers in bad condition.

The receivers in the cities, whose whole business is in perishable products, cannot afford to handle goods in this slipshod way. They candle the eggs that are forwarded to them to determine the quality, and pay for eggs not only according to their external appearance, but also the appearance and condition of the package in which they are received. Candling eggs consists in passing them before a bright light, as in testing to determine the fertility of eggs that are being incubated. When the egg is held before a light, the expert candler can tell in an instant whether it is fresh and good and, if not, just what is wrong with it. Except when kept at almost freezing temperature, eggs that have begun to decompose continue to deteriorate quite rapidly. Sometimes a lot of eggs is candled several times and the bad ones removed, before it reaches the last dealer who handles it.

Market poultry and pigeons are sold both alive and dead. Most dead poultry is dressed (that is, has the feathers removed), but pigeons and guineas are often marketed dead without plucking, and occasionally turkeys are treated in the same way. Live birds lose weight in transportation, especially when they are shipped in crowded and badly ventilated coops. Frequently many birds in a shipment die before their journey is over. Because of such losses, and because the price per pound of the best dressed poultry is usually much higher than the price per pound of the best live poultry, the impression that it is more profitable for a producer to dress his poultry is widespread. The result is that a great many people who have poultry to sell dress it just as they would to use at home and, putting

it into a box or a barrel, ship it to a market where the prices are high, expecting to get the highest price for it. A large part of such poultry arrives on the market in such a condition that it is hard to sell at any price, and much of it has to be thrown away.

Birds that are to be marketed should be kept without food or water for from twenty-four to thirty-six hours before killing. The object of this is to have the crop, gizzard, and intestines



FIG. 230. Barrel of dressed poultry opened on arrival at its destination.¹ (Photograph from Bureau of Chemistry, United States Department of Agriculture)

entirely empty. The killing is done by making a small, deep cut, that will at the same time penetrate the brain (making the bird unconscious) and sever one or two veins, thus letting the blood flow freely. This cut is usually made in the roof of the mouth, but sometimes in the neck. The former method is preferred because it leaves no wound exposed to the air. The common practice in picking poultry for home use is to scald the bird in water just below the boiling temperature. When this is done just right, the results are

very good; the feathers come off easily and the skin is not damaged. But if the bird is not held in the scalding water long enough, the feathers are hard to remove and the skin may be torn in several places in the process. If the bird is held in the water too long, the skin will be partly cooked. If it is scalded before it has been properly bled, the hot water will turn the skin red. The defects in scalded poultry do not show badly at first, and if it is packed and shipped at once, the shipper may think that it

¹ Note the large piece of ice remaining. If the ice should give out on the way, the poultry would spoil.

was in very good condition ; but if he could see it when the receiver unpacks it, he would be surprised to find how many blemishes there were on it and how poor it looked. Removing the feathers without scalding is called dry picking. It is an art which requires considerable practice. The novice who tries it usually tears the skin of the birds badly.

In order to reach the market in good condition, poultry must not only be properly killed and picked, but each carcass must be cooled as quickly as possible, to remove the animal heat that remains in it. This is done either by hanging the carcasses in a very cool place or by putting them in cold water. Meat of all kinds that is cooled immediately after killing will keep much longer than if cooling is neglected.

There are so many details which must have attention in dressing poultry for shipment, that it usually pays both producers and small collectors to sell poultry alive to those who have better facilities for hand-

ling it and whose operations are on such a scale that they can employ experts for all parts of the work of preparation.

Cold storage of poultry products. So abundant are the supplies of eggs in the spring, and of some kinds of dressed poultry in the summer, fall, and early winter, that large quantities could

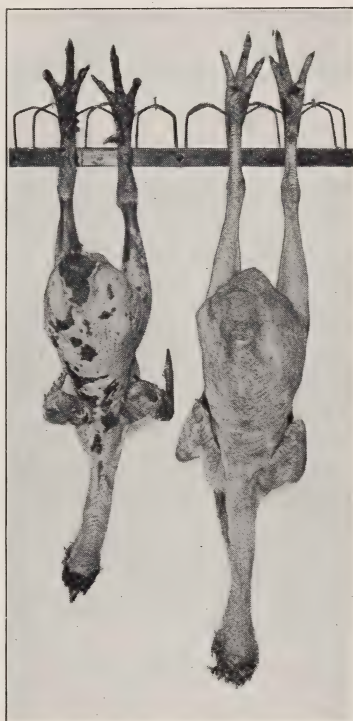


FIG. 231. A badly dressed and a well-dressed fowl. (Photograph from Bureau of Chemistry, United States Department of Agriculture)

not be sold at any price at seasons of plenty if there were no way of keeping them until a season of scarcity. For about half a century after the production of eggs and poultry began to receive special attention in this country, the profits of the ordinary producer were severely cut every spring and fall, because the market was overstocked. Consumers derived little benefit from this situation, because they could not use the surplus before it spoiled. The popular idea of the way to remedy the conditions was to have hens lay when eggs were scarce, and to have poultry ready for sale when supplies were insufficient. Experience, however, has shown that it is practically impossible to have a very large proportion of things of this kind produced out of their natural season. The relatively small numbers of people who succeed in doing so make very good profits, but the masses of producers and consumers are not benefited.

The solution of the problem of carrying the surplus of a season of abundance to a season of scarcity was discovered when methods of making ice artificially were perfected and it was found that the equipment used in manufacturing ice could be used to cool, to any desired degree, rooms for the storage of perishable produce. This form of refrigeration was at first used in place of the ordinary method (with natural ice), to keep goods for short periods. Much larger quantities could be taken care of in this way when for any reason a market was temporarily overstocked.

For hundreds of years it had been quite a common practice to preserve eggs in various ways. By packing them in salt, or in salt brine, or in limewater, eggs may be kept in very good condition for several months, and sometimes for nearly a year. As limed and pickled eggs were regularly sold in the markets, every dealer in eggs at once saw the possibilities of cold storage as a factor in the market egg trade. Wherever there was a storage house, dealers began to buy eggs when prices were low, and store them to sell when prices were high. At first a

great many of those who stored eggs lost money on them, either by the eggs spoiling in storage or because they kept the eggs too long, but after a few years' experience the operators of cold-storage plants learned the best temperatures for keeping the different kinds of produce and the best methods of arranging different articles in the chambers of the storage warehouses. They found that eggs kept best at 34 degrees Fahrenheit, that poultry must be frozen hard, and that the temperature in a



FIG. 232. Dressed fowls cooling on racks in dry-cooling room. (Photograph from Bureau of Chemistry, United States Department of Agriculture)

storage chamber must not be allowed to vary. Those who were putting eggs and poultry in cold storage found that it did not pay to store produce that was not perfectly sound and good, and that products which had been in cold storage must be used promptly after being taken out, and also that they must plan their sales to have all stored goods sold before the new crop began to come in, or they would lose money.

The development of cold-storage methods and their extensive use have been of great benefit to producers and consumers, as

well as to distributors of perishable food products. The storing of such products is a legitimate form of speculative business. It prevents waste and loss. The demand for eggs and poultry to go into cold storage raises the price at seasons of plenty and makes a good market for all eggs and poultry that are fit to store. The eggs and poultry that have been stored furnish consumers with supplies at reasonable prices for much longer seasons. As a rule supplies in storage are not kept there for very long periods. Speculators who want to be on the safe side plan very carefully so that most, if not all, of the stuff that they have stored shall be sold before new supplies become abundant in the market. To do this they have to watch very closely every condition affecting the markets, and to use good judgment in selling. Most of them do not, as is popularly supposed, hold their entire stock for the period when prices are highest. If they did, all would lose. Eggs begin to come out of storage about midsummer, and are withdrawn gradually for about six months. By far the greater part of the poultry stored goes into the warehouses in the fall and begins to come out soon after the winter holidays.

Within the limits of the time that goods may be carried in cold storage profitably, long storage has no more bad effects on eggs and poultry than refrigeration for short periods. Cold-storage products are usually of better than average quality if used immediately upon being withdrawn from storage.

Methods of selling at retail. For convenience in handling and counting them in quantities, eggs are packed in cases containing thirty dozen each, and wholesale transactions in eggs are by the case, but with the price usually quoted by the dozen. Consumers who use large quantities of eggs buy them by the case. The ordinary consumer buys them by the dozen. There is a widespread impression that, inasmuch as eggs vary greatly in size, the practice of selling them by count is not fair to the consumer. This feeling sometimes goes so far that laws are proposed, and even passed, requiring that eggs shall be sold by

weight. Such a law does not remain long in force, because weighing small quantities of eggs is troublesome and the greater number of consumers prefer to buy them by the dozen. In fact, while eggs are nominally sold by count both at wholesale and at retail, they are usually assorted according to size, and the prices graduated to suit. Considering size, condition, quality, and color of shell, as many as ten grades of eggs are sometimes made. Although the color of the shell of an egg has no relation whatever to its palatability or its nutritive value, eggs of a certain color sometimes command a premium. Thus, in New York City white eggs of the best grades will bring from five to ten cents a dozen more than brown eggs of equal quality, while in Boston the situation is exactly reversed.

When most of the poultry of each kind in any market is of about the same size and quality, it is customary to sell live poultry at wholesale at a uniform price by the dozen, and to sell at retail by the piece or by the pair. But as soon as any considerable part of the poultry of any kind in a market is larger than the general run of supplies, a difference is made, in the prices per dozen or per piece or per pair, between small birds and large ones. If the size of the largest specimens further increases, the range of weights becomes too great to be classified in this way, and selling by weight soon becomes the common practice. Conditions are the same for dead poultry, except that the change to selling by weight comes more quickly.

In preparing poultry for market by the method that has been described the head and feet were left on and the internal organs were not removed. The reason for this is that poultry keeps much better in this state. Removing these parts exposes the flesh at several places to the action of the air and of bacteria, which cause putrefaction. In many markets in poultry-producing sections it is customary to sell poultry drawn and with the head and feet off. In places where most of the poultry comes from a distance the waste parts of the carcass are not removed until it is bought by the consumer. Some people who buy in this way

think that they are being defrauded if the marketman weighs the bird before removing the offal. Sometimes, to satisfy such a customer, a dealer removes the offal before weighing, and the customer cheerfully pays a higher rate per pound, feeling that at any rate he is getting just what he pays for when he insists on having it done in this way. As far as the cost is concerned, it makes no difference to the consumer at what stage of distribution the offal is discarded.

Volume of products. In the United States and Canada the production and consumption of poultry products are very nearly equal, because each country has agricultural areas capable of supplying an enormous population with poultry and eggs. Production in such districts responds quickly to the increasing demands of other sections, but not in such volume as to create large surpluses for export. The present annual production of the United States is variously estimated at from \$600,000,000 to \$1,000,000,000. This wide difference exists because the census is only a partial one. In Canada no general census of poultry products has ever been taken.

The poultry statistics for the United States as collected decennially by the Bureau of the Census may be found complete in the full report of agricultural statistics. Those for the different states may be obtained in separate bulletins. Some of the states and provinces collect poultry statistics through state and provincial departments and furnish the reports to all persons desiring them. Persons living in communities which ship poultry products can usually learn from the local shippers the approximate amounts and the value of the produce that they handle. At the more important receiving points statistics of receipts are kept by such organizations as the Produce Exchange, Board of Trade, or Chamber of Commerce, and the results published in their annual reports. From such sources it is possible for pupils to get information as to the status and importance of the poultry trade in the communities in which they live.

CHAPTER XXI

EXHIBITIONS AND THE FANCY TRADE

Conditions in the fancy trade. The trade in fancy poultry and pigeons and in cage birds is on a very different basis from the trade in market products. With the arrangements for collecting poultry products and for holding them when that is desirable, it seldom happens that market products cannot be sold at any time when the producer wants to dispose of them. The fancy trade is quite closely limited to certain short seasons. In this trade prices depend as much upon the reputation of the seller as upon the quality of his stock. Very high prices are obtained only by those who have made a big reputation by winning at important shows, and have advertised their winnings extensively. Buyers of fancy stock prefer to deal directly with producers, and the greater part of the business is mail-order business. It is almost impossible to force the sale of this class of stock except by selling it for the table at market prices. The producer can only advertise and wait for customers, and what is not sold at fancy prices must be sold at market prices.

Exhibitions. Competitive exhibitions hold a very important place in the development and distribution of improved stocks of animals. In old times such exhibitions were informal gatherings of the persons in a locality who were interested in the improvement of a particular breed or variety. Our knowledge of these early gatherings of breeders of domestic birds is very limited and is mostly traditional. From what is known it appears that they were usually held in the evenings at public houses, and that each person taking part carried with him to the place of meeting one or more of his best birds; that these were

compared and their qualities discussed by the company, and that at the close each participant carried his exhibit home.

As the interest in breeding for fancy points extended, such gatherings became larger and assumed a more formal character, and rules were adopted for comparing, or judging, the birds; but it was not until about the middle of the nineteenth century



FIG. 233. View of a section of a large poultry show in Mechanics Building, Boston, Massachusetts

that the modern system of public exhibitions of poultry, pigeons, cage birds, and pet stock was inaugurated. The first exhibitions of this kind were held at the agricultural fairs. Very soon after these began to attract attention, special exhibitions, limited to this class of stock and held in suitable buildings in the winter, became frequent. Now large shows are held annually in nearly every large city and in hundreds of smaller cities, and every agricultural fair has its poultry department. For the sake of

breavity, shows at which poultry is the principal feature are called simply poultry shows, although they often include other kinds of domestic birds and all kinds of small domestic animals.

A large poultry show, with a great variety of exhibits of birds and of the appliances used in aviculture, affords an excellent opportunity to see good specimens of many kinds. Those who have such an opportunity ought to make the most of it. But the novice who can attend only small shows will find that, while he does not see as many different kinds of birds there and may not see many really fine specimens, the small show affords the beginner a much better opportunity to learn something about the differences that affect quality and value in fancy poultry and pigeons.

At the large show there is so much to see, and the differences between the winning specimens in any class are usually so slight, that only those who are familiar with many varieties can make a critical examination of the exhibits. At the smaller shows the varieties are not as numerous, the competing classes are smaller, and the differences between the specimens which win prizes are often plainly apparent, even to a novice, if he has a clue to the method of making the awards. Those who visit large shows can use their time to best advantage if they make as careful a study as they can of the few things in which they take the most interest, and take just a casual look at everything else. In the four or five days that it is open to the public it is not possible for any one to make a thorough, discriminating inspection of all that there is to be seen at a large poultry show, and an experienced visitor to such shows never tries to do so. At many of the small shows even a novice, by studying the exhibits systematically, may get a very good idea of all the classes and may add something to his accurate knowledge of a number of different kinds of birds.

Rudiments of judging. While even an ordinary poultry show contains a great deal that is of interest to those who know how to get at it, the visitor who does not know how to study the exhibits

and simply takes a cursory look at all of them, tires of the regular classes at a show in a very short time. After the awards have been made, the ribbons or cards on the coops will show the winning birds and their relative positions, but unless one knows something of the methods and rules of judging and compares the birds with some care, he is likely to get the impression that making comparisons between show birds requires a keener critical faculty than he possesses, and to conclude that it is quite useless for him to attempt to discover why the birds have been ranked in the order in which the judge has placed them.

Judging live stock is not a matter of simple comparisons of weights and dimensions. The personal opinions of the judge necessarily affect his decisions, and as the opinions of men differ, their judgments will vary. A judge is often in doubt as to which of two or more birds is (all things considered) the better specimen, but he must make his decision on the birds as they appear to him at the time, and that decision must stand for that competition. No one, no matter how well he may know the requirements of the standard for a variety and the methods of applying it, can discover by a study of a class of birds all of the judge's reasons for his decisions; but any one who will keep in mind and try to apply a few simple, general rules can look over a variety that he has never seen before, and of which he may not know the name, and (unless the judge has been very erratic in his decisions) can see why most of the awards in a small class of varied quality have been made.

These rules are:

1. The character or characters that most conspicuously distinguish a type are given most consideration in judging.
2. Color of plumage is given more consideration than shape, unless some shape character is unusually striking.
3. Quality in color of plumage consists in evenness and purity of shade in solid-colored specimens, and in sound colors and distinctness of the pattern in party-colored specimens.

4. The shape of extraordinary superficial shape characters, such as crests, very large combs, heavy foot-feathering, etc., is usually given as much consideration as color.

The first rule really includes all the others, and although this is not usually admitted by the exponents of current methods of judging live stock, in practice it is the fundamental rule in judging. One reason why people who have a little knowledge of standards for well-bred poultry, and of the methods of applying them, are almost always puzzled by the awards at poultry shows is because they try to analyze them in accordance with the commonly accepted theory of judging by points, which assigns definite numerical values to certain characters. This theory assumes that the judge, taking these values as a basis, computes the values of faults with mathematical accuracy. This is not possible where the computation is based upon an opinion.

To illustrate the application of the rules given, let us apply them to some well-known varieties, taking first the Barred Plymouth Rock.

The conspicuous distinguishing character of this variety is the barred color pattern; therefore color of plumage has most consideration in judging it. The pattern is the same all over the bird; therefore every feather should be barred. The pattern must be sharply defined; therefore the colors must be clean-cut and the bars straight and of nearly equal width on each feather, with the width of bars on feathers of different sizes proportionate to the width of the feather. These requirements seem very simple when stated, but a close examination of ordinary exhibition Barred Plymouth Rocks will show very few specimens that closely approach perfection according to the rules.

Now take the White Wyandotte. The most conspicuous character of any white bird is its whiteness. In judging this variety, therefore, whiteness will have more consideration than any other quality. White Wyandottes are distinguished from White Plymouth Rocks by the shape of the comb; therefore

the shape of the comb will be given more attention by the judge than if there were other distinguishing features.

Silver-Laced Wyandottes are conspicuous for their color pattern; therefore the most important thing is that this shall be well defined and uniform, the white centers clean and white and the black edges intensely black. Uniformity in such markings is very difficult to produce. A bird may be well marked in one section and very poorly marked in another.

In Partridge Cochins the most conspicuous character is extreme feather development; the next is color of plumage, which differs in male and female. Feather development and the shape which it produces will therefore have about equal consideration with color. In color the male is black on the breast and body, with a red neck and back, the feathers of the hackle and the saddle having black stripes in the center; therefore, in the male, quality in color consists in blackness in the black sections, a uniform red in the red sections, and clear and sharp striping wherever it appears. The Partridge Cochin female has plumage of brown penciled with a darker brown; therefore to the eye of a poultry fancier the beauty of her color consists in well-defined penciling and a harmonious contrast in the two shades of color.

A White-Crested Black Polish fowl is most conspicuous for its large white crest; therefore the crest is the most important feature to be considered in judging this variety. But color is also very important, for if the white feathers of the crest are partly mixed with black, or the black of the body is dull, the effect is not pleasing.

The Fantail Pigeon is most conspicuous for its fan-shaped tail; therefore this is the most important thing in judging. The tail must not only be large and well shaped, but must be carried in an attractive manner. It must not be too large, because then the bird cannot carry it in a good position. In addition to carrying the tail in a good position, the bird must pose so that the whole attitude adds to the attractiveness of the principal feature.

Similarly with the Pouter Pigeon, the globular crop, which is its distinctive character, must be large and well formed, and in addition the general carriage must be such as to show the pouting trait to the best advantage.

The same rules of color which apply to fowls apply also to pigeons. The color patterns of pigeons are much more numerous, but as a rule the principal required features are at once obvious to any one who keeps in mind the general rules that have been given.

After the more conspicuous characters, many minor characters are given particular consideration. In theoretical statements of methods of judging, these minor characters are often treated as of equal importance with

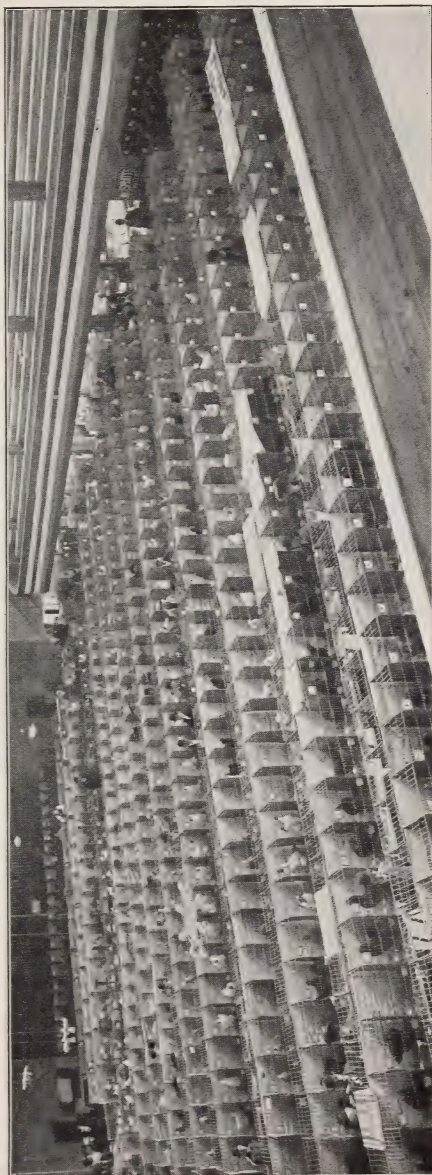


FIG. 234. Almost complete view of a poultry show at Worcester, Massachusetts

the conspicuous characters, but in ordinary judging practice they are not often so treated, except in the case of disqualifying faults, to be noted presently. The less conspicuous characters, including shape of body (in regard to which the average fancier and judge is somewhat careless, not discriminating between closely related types), become important in making decisions between specimens which appear to be equal in the more conspicuous characters. Because of this there is a tendency to exaggerate some one minor character whenever a high degree of uniformity in characters that



FIG. 235. Saddle Fantail Pigeon¹

are of primary importance in judging is reached.

Disqualifications. The practice of judging the relative merits of exhibition birds principally by a few striking characters tends to make breeders and exhibitors neglect many little things which affect the appearance of a bird. This is especially the case with exhibitors competing under judges who are partial to some conspicuous character. To prevent this, and to place the heaviest possible penalty upon serious faults that are easily overlooked, certain faults are made disqualifications; that is, a bird having any one of these faults is absolutely debarred from competition, no matter how good it may be in other respects.

There is general agreement as to the wisdom and justice of disqualifying for deformities or for mutilations of the feathers

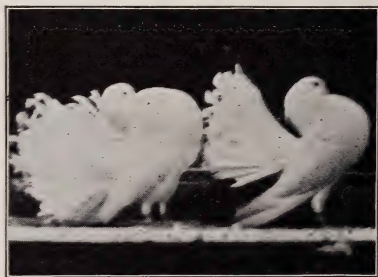


FIG. 236. White Fantail Pigeons¹

¹ Reproduced, by permission, from "Domesticated Animals and Plants," by E. Davenport.

to conceal a fault. In regard to disqualifying for trivial faults, fanciers differ in opinion. Many hold that this has been carried to a ridiculous extreme in some cases. Thus, in all clean-legged fowls it is required that the shanks and toes shall be free from small feathers, stubs, or down. Most fanciers agree that conspicuous feathers and stubs should disqualify, but many consider that to disqualify for a minute bit of down, which can hardly be seen without the aid of a magnifying glass, is going too far.

Unless the judge has overlooked a disqualification (and this rarely happens), none will be found on a bird that has been awarded a prize. If in any class there is a bird which is not given a place, though apparently superior to any of the prize winners in the characters most distinctive of its variety, that bird usually has some disqualification. The list of disqualifications is too long to be given here. It is not the same throughout for all varieties. Exhibitors and breeders do not attempt to keep track of the disqualifications (which are changed occasionally) for any but the varieties in which they are especially interested.

Methods of judging. When exhibitions of domestic birds were first held, the awards were usually made by committees of two or three judges. The object in doing this was to insure impartiality and to make connivance between a judge and an exhibitor more difficult. It was found that this plan did not work well. Often the opinions of one man dominated, or, if the man could not have his way, the committee wrangled and took too long to make its decisions. So by degrees the committee plan was abandoned and a single judge made the awards in accordance with standards and rules agreed upon by associations of exhibitors and judges.

At first all judging was done by comparison of the specimens of each class entered in competition. That is the method still in general use in Europe and widely used in America. But to many exhibitors comparison judging seemed unsatisfactory, because by it only the winning birds were indicated, and exhibitors

whose birds did not win usually wanted to know how their birds compared with the winners. To meet this demand score-card judging was adopted. In this method of judging, the characters to be considered are divided into sections, which are named in order on a card having corresponding blank spaces in which to mark numerical cuts for faults in each section. The score cards used at poultry shows where judging is done by that method do not indicate to which of several possible faults a cut applies, except that, having one column for shape cuts and another for color cuts, they show in which class the fault appears. In many educational and private score cards the names of the common faults in each section are printed in the space allotted that section, in order that the fault may be accurately checked. The use of cards with so much detail is not practical in ordinary competition.

The score of a bird judged by the score-card method is the difference between 100 (taken as the symbol of the perfect bird of any variety) and the sum of all the cuts made for faults. The common cuts for faults are $\frac{1}{2}$ for a slight fault, 1 for a pronounced fault, and $1\frac{1}{2}$ for a very bad fault. Occasionally larger cuts are made for serious faults. Theoretically the score is supposed to represent accurately the relation of a specimen to a perfect specimen, but really scores only represent in a general way the judges' opinions of the relative values of the birds in a class, and indicate to the exhibitor where the judge found faults in his bird.

Exhibition quality and value. The winning of a prize at an important show gives a breeder of fancy birds a standing that he could not otherwise acquire. The greater part of the sales of poultry of this class are made by mail to persons who do not know the breeder personally and do not see his stock until after purchasing. No matter how good his stock may be, those who want to buy will not pay much attention to his claims for its superior quality until they have such confirmation of those claims as is given by the winning of prizes in competition. Then the prices which a breeder can get for his stock will be

regulated largely by the prices obtained by other successful exhibitors at shows of the same class.

There is a wide range of prices from those that can be secured for stock of the quality that wins at the greatest shows, to those that can be obtained for the kind that wins at ordinary small shows. High prices are paid for noted winners and for other stock of the same breeding, as much for the advertising value of ownership of fine stock as for the actual value of the birds to breed from or to exhibit again. A breeder who wins at some very small show may find it hard to sell either stock or eggs for hatching except at a slight advance over market prices. Some breeders who have made remarkable records in winning at the best shows can get very high prices for their prize-winning stock and for the eggs from it. Fowls sometimes sell as high as \$500 each, and eggs at \$2 each. Pigeons also bring very high prices at times, although fewer people are interested in them and sales are not so numerous. The ordinary prices for good stock are quite reasonable, considering how few really fine specimens are produced. The average novice finds that fowls at from \$10 to \$25 a trio and pigeons at from \$5 to \$15 a pair have all the quality that he can appreciate.

In the early days of modern fancy poultry culture those breeders who had great reputations could get relatively high prices for almost any bird that would pass as a breeding specimen of its kind. This is still true of breeders who successfully introduce new varieties or who suddenly attain prominence with stock of their own breeding. But as the stock of a leading breeder becomes widely distributed among smaller breeders, the competition of his customers reduces his sales, and especially the sales of the cheaper grades of stock. The most troublesome problem that the best breeders have is to get rid of the lower grades of their stock at a fair profit.

Why good breeders have much low-priced stock. Novices in the breeding of fine stock commonly suppose that all pure-bred

stock of any variety is of uniform quality. When they learn that, as a rule, only a small part of the young birds hatched from good stock is considered of superior quality, they often conclude that the ideas and the standards of fanciers must be wrong. Even professional and scientific men who become interested in fancy poultry and pigeons often take this view and, after considering the question carefully from their standpoint, try to explain to fanciers how, by changing a standard, they might secure a much larger proportion of specimens approximately perfect according to the standard used. In the case of varieties in which the finest specimens of the different sexes are secured from different matings, many novices waste a great deal of time trying to convince old fanciers that their standards and methods are illogical and unnatural.

To those who do not understand the philosophy of the interest in breeding to highly specialized types the arguments for standards that are adjusted to common results and are easy to attain appear to be unanswerable. Upon the fancier who does understand this philosophy they make no impression at all. The breeding and exhibiting of fancy stock of any kind is primarily a game. The rules of the game are in a measure arbitrary, like the rules in baseball or football or any other game. At the same time they must be framed in the interests of the development of the game as a sport and also as a spectacle. They must be reasonable and must be suited to players of all degrees of skill.

Standards and rules for judging fancy stock develop just as the rules of athletic games develop. A generation ago such games as baseball and football were comparatively simple games in which boys and men might take very creditable parts without devoting a great deal of attention to practice. These games still afford recreation to many who use them for that purpose only, but they have also been developed so that players of exceptional skill play competition games for the interest of a public which studies the fine points of these games and compares the abilities

of the players. People who take an interest in and patronize professional or high-class amateur ball games do so because in them skillful and well-trained players do difficult things. It is the same in the breeding of fancy live stock to a high standard of excellence. When a breed or a variety is first made, the interest of the breeders centers in a few characters, precisely as the interest of a novice in any line centers in a few prominent features. As breeders grow in experience and in skill, and as the characters to which they first give special attention become fixed, they demand better quality in these and also turn their attention to the development of other characters. The more difficult a combination of characters is to produce, the greater interest the fancier takes in trying to produce it. When a standard calls for a high degree of excellence in many characters, the proportion of specimens of high excellence, as measured by that standard, will almost always be small. It is because this is the case that the rare specimens are considered so valuable.

Fancy and utility types in the same variety. The great majority of American breeders of fancy poultry seek to secure a high degree of practical value in combination with fancy quality in their stock. There are some fanciers who breed only for fancy points, and some market poultry growers who pay no attention at all to them, but as a rule those who give market poultry special attention want well-bred stock of good ordinary quality, and those who keep poultry for pleasure want the flock kept for this purpose to supply at least their own tables with eggs and meat. The breeder who wishes to combine fancy and utility properties in any kind of live stock must breed only from specimens that are meritorious in both directions, selecting much more carefully than when breeding for one class of properties.

CHAPTER XXII

OCCUPATIONS RELATED TO AVICULTURE

The value of a knowledge of domestic birds is not limited to the use which may be made of it in keeping them for profit or for pleasure. Any occupation in which a great many people are interested affords opportunities to combine the knowledge relating to it with special knowledge or skill in other lines, to the advantage of those who are able to do so. Just as the large market or fancy poultry business may develop from a small flock kept to supply the owner's table or to give him a little recreation, many special occupations grow out of particular interests of aviculturists. Some of these have been mentioned incidentally in preceding chapters. In this chapter the principal occupations associated with aviculture will be discussed both in their relation to that subject and with respect to their possible interest for those who plan to devote themselves to lines of work which would qualify them for special service in aviculture.

Judging fancy poultry and pigeons. There is the same difference between selecting one's own birds according to quality and judging the birds of others in competition that there is between performing well in a friendly game and performing well in a competition where the stakes are important and feeling runs high. Many fanciers who are good breeders and also good judges under other conditions make poor judges in competitions. In judging at shows decisions must be made quickly, there is little opportunity to rectify mistakes, and if a judge makes serious blunders he is severely criticized. A person who deliberates a long time before coming to a decision, and who is very sensitive to criticisms of his errors, even though he knows

that some errors are sure to be made by every one and that unprejudiced exhibitors make allowance for this, will not make a successful judge of poultry and pigeons. Judges as a class are not the men who know the most about standard-bred birds or who are the most skillful in breeding them, although some of the best breeders are among the best judges. Almost all fanciers get opportunities to act as judges. If their work is satisfactory, the demand for their services increases until in time their income from this source may be large enough to make it worth while to adjust their other affairs to their engagements at poultry shows.

Journalism. There were a few books on poultry and pigeons written in the first half of the last century, and a larger number immediately following the "hen-fever" period. These and the articles on poultry and pigeons in agricultural papers constituted the literature of the subject until about 1870. Then there appeared a number of poultry journals, most of which gave some attention to other domestic birds. The demand for special journals arose because many people who were interested in poultry were living in cities and were not interested in general agriculture; they wanted more information about poultry matters than the agricultural papers could give. Advertisers of poultry and pigeons, and of goods bought by aviculturists, also wished advertising mediums through which they could reach buyers at less cost than they could through the agricultural papers. The rates for advertising are based upon circulation, and if only a small class of the readers of a publication are buyers of a particular class of goods advertised in it, the cost of reaching them may be too great. Whenever any interest becomes of sufficient importance, journals especially devoted to it are issued, for the convenience of buyers and sellers as well as for the information they contain. Until about 1890 nearly all poultry journals were small publications which the owners looked after in their spare time. Then they began to increase in number and

importance, and before long there were a great many that gave regular employment to editors, advertising solicitors, and subscription solicitors, who were employed for their knowledge of poultry and their acquaintance with poultrymen as well as for special qualifications for their respective departments.

Art. The illustrating of poultry journals and books, and of the catalogues of fanciers and other advertisers in poultry literature, gives employment to a constantly increasing number of artists. In order to successfully portray birds for critical fanciers, an artist must be something of a fancier. It is not enough that he should draw or paint them as he sees them ; he must know how to pose birds of different kinds, types, and breeds so that his pictures will show the proper characteristic poses and show the most important characters to their best advantage. Since the half-tone process of making illustrations was perfected, the greatest demand is for photographic work, but unless an artist is able to work over and complete a defective photograph with brush or pencil, he cannot make this line of work profitable. Most birds are difficult subjects to photograph, and only a small proportion of the photographs that are taken can be used without retouching. A photographer may work for an hour to get a bird posed to suit him, and then, just as he presses the bulb, the bird, by a slight movement of the head or foot, may spoil one feature in a photograph that is otherwise all that could be desired. An artist who can draw birds can remedy such defects ; the ordinary commercial artist cannot.

Invention. The most important invention used in aviculture is the artificial incubator. Methods of hatching eggs by artificial heat were developed independently by the Egyptians and by the Chinese thousands of years ago, and are still used in Egypt and China. The arrangements used in these old hatcheries are crude, and the success of the operation depends upon exceptional skill and judgment on the part of the operator. Operating incubators is a business continued in the same families for centuries. Each hatchery does the hatching for a community.

In the early part of the eighteenth century a French scientist named Réaumur, who was much interested in poultry, began to make experiments in artificial hatching and brooding. In 1750 he published a very full account of these and other experiments which he had made with poultry. His idea was to devise a modification of the Egyptian practice of hatching in ovens, suited to the conditions of a more advanced civilization. He succeeded in hatching eggs by utilizing the waste heat from a baker's oven, and also hatched eggs in hotbeds heated with decomposing manure. He applied the hotbed principle to the brooding of chickens with some success. But the methods that he devised were not adapted to general use.

After Réaumur many others experimented with artificial hatching. Some of the ideas were obviously more impractical than those of Réaumur, but the experimenters tried them out and sometimes succeeded in hatching chickens by very peculiar and laborious processes. One man in England, in the latter part of the eighteenth century, hatched some chickens from eggs placed in cotton batting in a sieve adjusted over a charcoal fire in a small fireplace. The fire was watched constantly for three weeks, either by himself or by some member of his family. He demonstrated that eggs could be hatched in this way, but not that it could be done profitably. Practical incubators were not produced until about forty years ago.

Although incubators and brooders have been brought to a relatively high state of efficiency, they are far from perfect. Inventors of the best machines are still studying ways to improve them. In this and many other fields there are opportunities for inventive genius.

Education and investigation. Lectures on poultry have been given occasionally at agricultural institutes in the United States since about 1860. After 1890 the demand for such lectures, and the number given, constantly increased, and ability to speak in public became valuable to one versed in aviculture. Then the

study of poultry culture was introduced into agricultural colleges, and a new field was opened to poultry keepers with a faculty for teaching, and for trained teachers with special knowledge of domestic birds. The teaching of poultry culture impressed upon those engaged in it the need of scientific investigation of many problems not clearly understood even by the best-informed poultrymen.

The agricultural experiment stations had been giving little attention to some of these problems except in a desultory way and without important results. As the demands for more accurate information on many topics increased, many of the experiment stations began to make important poultry investigations. For this work men specially trained in various sciences were required. As a rule the men that were secured for such work knew very little about poultry when they began their investigations, but it was much easier for them to acquire a knowledge of poultry sufficient for their needs than for persons who had poultry knowledge and no scientific training to qualify for positions as investigators. The field of investigation of matters relating to poultry is constantly being extended. Proficiency in physics, chemistry, biology, surgery, and medicine, and in higher mathematics as far as it relates to the problems of any of the sciences mentioned, will always be in demand for scientific work in aviculture. In the future the most efficient teachers and investigators will be those whose early familiarity with domestic birds has given a greater insight into the subject than is usually possessed by those who take up the study of the subject comparatively late in life.

Manufacturing and commerce. It is very much easier to build up a large business in the manufacture or the sale of articles used by poultry and pigeon keepers than to build up a large business as a breeder of domestic birds of any kind. As has been stated in connection with nearly every kind of bird mentioned in this book, a poultry keeper's operations are limited by the difficulty of keeping large numbers of birds continuously on

the same land, and also by the exacting nature of the work of caring for them under such conditions. In manufacturing and commercial operations there are no such limitations. The possibilities of development depend upon the extent of the demand for the articles that are manufactured or sold, and only a small proportion of the employees need to be persons versed in aviculture. But in competition with other manufacturers or merchants those who understand domestic birds and know all the different phases of interest in them have a very great advantage over those who do not.

Legislation and litigation. The rise of new industries creates new problems for legislators, executive departments, courts, and lawyers. An industry in which many people are interested eventually reaches a stage where it is profitable for lawyers to specialize to some extent in laws affecting it, and politic for legislators and administrators to do what is in their power to protect the interests of those engaged in it, and to advance those interests for the benefit of the whole community. A special field is opening for lawyers familiar with aviculture and with its relations to other matters, just as within a few years the field has opened to teachers and investigators.

The possible uses of a knowledge of aviculture to young people who are naturally inclined toward intellectual professions, art, invention, manufacturing, or trading have not been given for the sake of urging students to direct their course especially toward work connected with aviculture. The object is only to show those who take an interest in the subject that it is worth while to cultivate that interest for other reasons, as well as for the profit or the pleasure that may be immediately derived from it.

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